

**ANTENATAL CARE LITERACY OF PREGNANT WOMEN IN THABA-
TSEKA AND MASERU DISTRICTS, LESOTHO**

by

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ANTENATAL CARE LITERACY OF PREGNANT WOMEN IN THABA-TSEKA AND MASERU DISTRICTS, LESOTHO

I declare that the above dissertation is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

T. Seeiso

Date: 27.11.2017

DEDICATION

This work is dedicated to my two children for inspiration in their lives.

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I would like to thank the following for their contributions and/ or support during the study:

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ANTENATAL CARE LITERACY OF PREGNANT WOMEN IN THABA-TSEKA AND MASERU DISTRICTS, LESOTHO

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ABSTRACT

The proposition that inadequate health literacy on antenatal care (ANC) is exacerbating maternal mortality in sub Saharan Africa (SSA) is undisputable. Yet, little is known about ANC literacy in Lesotho, an SSA country with high maternal mortality rates. This cross-sectional study explored the levels of ANC literacy and the associated factors in 451 purposively sampled women in two districts using a semi-structured questionnaire making recourse to statistical principles.

Overall, 16.4% of the participants had grossly inadequate ANC literacy, while 79.8% had marginal levels. Geographic location and level of education were the most significant predictors of ANC literacy. Participants had the lowest scores on knowledge of danger signs in pregnancy and true signs of labour. Furthermore, significant knowledge gaps on baby layette and mother's essential items for delivery were found.

Adequate ANC literacy is critical to reducing maternal mortality in Lesotho. Improving access to ANC education, particularly in rural areas is recommended.

Keywords: Antenatal care, Antenatal care literacy; health literacy; maternal mortality; pregnancy.

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ABBREVIATIONS AND ACRONYMS

ANC	Antenatal Care
CD	Compact disk
CHAL	Christian Health Association of Lesotho
DHS	Demographic Health Survey
EBSCO	Elton B. Stephens Company
FANC	Focused Antenatal Care
GI	Gastrointestinal
GDM	Gestational diabetes mellitus
GP	General Practitioner
GOL	Government of Lesotho
GON	Government of Namibia
GOS	Government of Swaziland
GOZ	Government of Zimbabwe
HCG	Chorionic gonadotropin
HIV	Human Immunodeficiency Virus
IEC	Information, Education and Communication
MCC	Millennium Challenge Corporation
NVP	Nausea and vomiting in pregnancy
NVS	Newest Vital Sign
PDSMAF	Pregnancy danger signs mobile architecture framework
PROM	Premature rupture of membranes
ROM	Rapture of membranes
REALM	Rapid Estimate of Adult Literacy in Medicine
STIs	Sexually transmitted infections

TNA	Trained Nursing Assistant
TOFHLA	Test of Functional Health literacy
UNISA	University of South Africa
WHO	World Health Organization

CHAPTER ONE

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Given the numerous historical accounts on antenatal care (ANC) (Nixon 1948:71; Lewis 1980:1; Docherty & Leathar 1982:85), the importance of quality ANC services to the reduction of maternal mortality is indisputable. ANC provides appropriate advice for a healthy pregnancy, safe childbirth, and postnatal recovery, thus safeguarding the life of a pregnant woman and the unborn child (Fraser & Cooper 2009:263). World Health Organization (WHO) (2006:2) emphasises that pregnant women should have basic knowledge of ANC health information or ANC literacy, particularly on danger signs of pregnancy and labour to enable them to seek appropriate care early (Berkman, Sheridan, Donahue, Halpern & Crotty 2011:98). Yet, inadequate health literacy on ANC remains a problem worldwide, particularly in sub Saharan Africa.

Lesotho has one of the highest maternal mortality ratios in sub Saharan Africa (GOL 2014:42). According to WHO (2015), the maternal mortality ratio for Lesotho was 487 per 100,000 in 2015. This high ratio has been attributed to geographic and economic barriers (Satti, Motsamai, Chetane, Marumo, Barry, Riley et al 2012), but low ANC literacy may be equally to blame given that traditional birth attendants or paraprofessional midwives who have limited formal training are the main providers of ANC services in the rural settings. Yet, very little is known about ANC literacy in the country (Hussein 2012:136). The Government of Lesotho (GOL) (2014:42) indicates that ineffective decision-making by pregnant women may be contributing to maternal morbidity and mortality. It is reasonable to assume that inadequate health literacy is the major cause of the ineffective decision making by the pregnant women. According to Nutbeam (2008:2072), health literacy is critical for making appropriate health decisions.

The purpose of this study was to explore knowledge and gaps in ANC literacy among women attending ANC in Lesotho with the aim to improve ANC literacy and ultimately ANC outcomes in the country. This quantitative study explored ANC literacy amongst pregnant women on ANC educational components recommended by the WHO

(2006:23) at two purposefully selected hospitals in two of the ten administrative districts in Lesotho.

1.2 BACKGROUND TO THE RESEARCH PROBLEM

While the global coverage of ANC has significantly improved, with 71% of pregnant women worldwide now receiving ANC services (Lincetto, Mothebesoane-Anoh, Gomez & Munjanja 2006:52), only 44% of pregnant women in sub-Saharan Africa attend the four ANC visits that are recommended by the WHO (Lincetto et al 2006:52). This attendance is far too low when compared to more than 95% in industrialised countries (Lincetto et al 2006:52) and this may be due to inadequate health literacy. Lincetto et al (2006:52) note that inadequate health literacy may be one of the major causes of poor ANC outcomes particularly in women of low socioeconomic status (Kindig, Panzer & Nielsen-Bohlman 2004:65). Nnebue, Ebenebe, Adinma, Iyoke, Obionu and Ilika (2014:314) observe that the levels of ANC literacy of pregnant women are an important indicator of the quality of ANC services in sub Saharan Africa. Of note, ANC education interventions certainly have a positive impact on maternal outcomes, preventing up to 80% of maternal mortality (Anyia, Hydara & Jaiteh 2008:2; Al Otaiby 2013:4; Lori, Dahlem, Ackah & Adanu 2014:243).

Despite recommendations by WHO to embrace comprehensive ANC education and a minimum of four ANC visits (Lincetto et al 2006:53), many African settings may be failing to meet the current core objectives of antenatal care, particularly ANC education (Anumba & Jivraj 2016:1). The WHO (2006:2) recommends that ANC education should focus on four core educational components critical for maternal outcomes namely, knowledge of preparedness for childbirth, knowledge of nutrition in pregnancy, knowledge of danger signs in pregnancy, and knowledge of true signs of labour. Critically, the assessment of ANC literacy should therefore include at least these four ANC educational components.

The challenge of assessing ANC educational components in the African setting is compounded by the lack of reliable literacy assessment tools for this purpose. Pre-existing tools, having been criticised for failing to capture health literacy adequately and for their lack of cultural sensitivity (Weiss, Mays, Martz, Castro, DeWalt, Pignone et al 2005:516), need to be contextualised to the local setting. Thus, the task of assessing ANC educational components in the African setting also revitalises the

importance of health literacy assessments in the African setting – where such assessments are quite rare despite the high levels of maternal mortality.

The various tools that have been used to measure general health literacy in and out of Africa are unfortunately inapplicable to the measurement of ANC health literacy. These include: Rapid Estimate of Adult Literacy in Medicine (REALM), Test of Functional Health Literacy in Adults (TOFHLA) and the Newest Vital Sign (NVS) (Weiss et al 2005:516). Thus the assessment of ANC health literacy in the African setting is therefore important in that it can lead to the design and standardisation of new approaches and tools for the measurement of ANC health literacy.

Maternal mortality rates in Lesotho are higher in rural mountainous areas where only about 29% of women attend antenatal care services (GOL 2014:42). The GOL, in its millennium development goals (GOL 2014:42), targeted reducing maternal deaths to 300 deaths per 100,000 live births by 2015. To achieve this goal, the GOL prioritised improving coverage of ANC services (GOL 2014:43), but did not include ANC literacy in its list of priorities. While the efforts by the government are commendable, low levels of ANC literacy among pregnant women remain a threat to reducing maternal mortality rates (Guttersrud, Naigaga & Pettersen 2015:2402). GOL (2014:43) notes that failure to recognise pregnancy complications, which may be associated with limited ANC literacy, is one major contributing factor to high levels of maternal mortality rates in the country.

The rationale for the study was based on the link between maternal health literacy and ANC outcomes. Based on the proposition that health literacy is paramount to health outcomes (Nutbeam 2000:232), improved ANC education can certainly lead to better maternal outcomes. Health literacy, as defined by Nutbeam (2008:2072), is the degree to which individuals have the capacity to obtain, process and understand basic health information needed to make appropriate health decisions. For better health outcomes, Nutbeam (2000:266) emphasise the need for better functional health literacy through health education.

1.3 PROBLEM STATEMENT

The disproportionately higher maternal mortality rates in rural mountainous areas and low attendance of antenatal care services is disconcerting (GOL 2014:42). In addition, the lack of prioritisation of ANC literacy in Lesotho may be contributing to low ANC

literacy and poor maternal outcomes. Arguably, about 80% of maternal mortality could be prevented if the affected mother had basic health literacy (Lori et al 2014:243).

As Fawole, Okunlola and Adekunle (2008:1054) recommend, research on ANC in low income countries should be directed at improving health literacy of pregnant women. However, current ANC programmes focus more on quantifiable data such as the number of antenatal visits than ANC literacy. A situational analysis conducted by the researcher between October 2015 and February 2016 at one of the study sites, which was prompted by the high number of pregnant women presenting for delivery in advanced stages of labour, showed apathy of pregnant women on true signs of labour. The same situational analysis revealed that pregnant women had insufficient knowledge of critical ANC components, including true signs of labour. In addition, about 53% of obstetric records between October 2015 and February 2016 at this hospital did not reflect evidence of health education to the women during ANC visits as recommended by the obstetric guidelines of Lesotho. This study therefore explored knowledge and gaps in ANC literacy among women attending ANC in Lesotho with the aim of improving ANC outcomes.

1.4 STUDY AIM, OBJECTIVES AND RESEARCH QUESTION

1.4.1 Study aim

The aim of this study was to explore the levels of maternal health literacy to improve delivery of ANC health education and ANC outcomes in the country.

1.4.2 Objectives

Research objectives of the study were to:

- (i) Evaluate the levels ANC literacy in Lesotho.
- (ii) Identify factors associated with inadequate literacy in Lesotho.
- (iii) Identify knowledge gaps on ANC educational components.

1.4.3 Research questions

- (i) What information do pregnant women in Lesotho have on ANC educational components?
- (ii) Which factors are associated with inadequate literacy in Lesotho?
- (iii) Which educational components of the ANC literacy need to be strengthened?

1.5 THEORETICAL FRAMEWORK FOR THE STUDY

The theoretical framework of the study was based on four main WHO standards for maternal and neonatal care (WHO 2006:23), namely;

- Knowledge of danger signs in pregnancy,
- True signs of labour,
- Nutrition in pregnancy and
- Preparedness for childbirth. These four educational components were selected for their practical value in promoting better maternal health outcomes.

1.6 SIGNIFICANCE OF THE STUDY

The major positive outcome of this study is that it could improve maternal outcomes of pregnant women in Lesotho. The identified knowledge gaps on ANC education may improve ANC teaching strategies particularly for rural women and those with low levels of education.

Critically, this study provides important information to guide policy makers towards development of relevant ANC educational policies in Lesotho. Furthermore, the study also provides a baseline for future research on ANC health literacy in the country.

1.7 CONCEPTUAL AND OPERATIONAL DEFINITIONS

The key concepts included in the study are: antenatal care; antenatal education; health literacy; assessment tool; maternal mortality rate; pregnancy; and nurse.

1.7.1 Antenatal care

Jana (2002:219) defines antenatal care as the supervision of pregnant women to protect their health and that of the child. ANC services include education, counselling, screening and treatment to assure that the mother and her foetus are healthy (Di Mario, Basevi, Gori & Spettoli 2005:6). In this study antenatal care is the care that is provided to pregnant women at ANC clinics to achieve positive pregnancy outcomes.

1.7.2 Antenatal education

Antenatal education is the advice given to pregnant woman by midwives at antenatal care (Tiran 2012:12). In this study, antenatal education is pregnancy related advice

given to pregnant women by nurses to ensure satisfactory foetal and maternal health. Antenatal education is therefore the independent variable in the study.

1.7.3 Health literacy

Ratzan and Parker (2000:1) define health literacy as “the level at which an individual has the capacity to obtain, process and understand basic health information and services needed to make proper health decisions”. Health literacy means ones’ ability to interpret medical prescriptions and follow self-care instructions (Mosby 2009:396). According to Kindig et al (2004:31), health literacy refers to how well a person acquires and understands health information in order to make good health decisions.

In this study ANC literacy is the capacity of pregnant women to recall and interpret key ANC educational components. Health literacy is the dependent variable in the study.

1.7.4 Assessment tool

Assessment is the process of collecting evidence and making judgements on whether an individual has achieved predetermined outcomes (Billings & Halstead 2016:387). Assessment is designed to help educators identify the strengths and weaknesses of learners. The word ‘tool’ refers to a thing used to help perform a job (Oxford Dictionary of English 2010:753). Assessment tool is a device that educators use to document skills acquisition and educational needs of learners (Billings & Halstead 2016:387). In this study assessment tool is a framework designed to assess comprehension of the key ANC educational components in pregnant women.

1.7.5 Maternal mortality rate

Tiran (2012:99) states that maternal mortality rate is the number of maternal deaths in a certain area within 42 days of pregnancy termination due to pregnancy and childbirth complications divided by total live births for the same geographic area within a calendar year, multiplied by 100,000. Similarly, maternal mortality rate refers to death of women due to pregnancy related complications as a result of low ANC literacy.

1.7.6 Pregnancy

The period from conception to birth which usually lasts 40 weeks beginning from the first day of the woman's last menstrual period (Tiran 2012:114). Yates (2010:96)

defines pregnancy as the state of carrying a developing embryo foetus within the female body. These definitions apply to the current study.

1.7.7 Nurse

Tiran (2012:83) defines a nurse as a person who is trained to provide care to people who are sick with the goal of making them healthy. In this study, a nurse is any person providing health education to pregnant women at ANC.

1.8 RESEARCH DESIGN AND METHODS

1.8.1 Research Design

Grove, Burns and Gray (2014:213) define a research design as a blueprint for conducting a study that maximises control over factors that could interfere with the validity of the findings as it gives the researcher greater control. A cross sectional quantitative study was used to assess the levels of knowledge on ANC educational components and the associated variables in a rural and a peri-urban setting of Lesotho. Quantitative research relies primarily on numerical data in order to understand the phenomenon under study (Grove et al 2014:211).

1.8.2 Population and Sampling

The study population comprised pregnant women in peri-urban and rural areas of the country, who were selected because of their higher vulnerability to maternal mortality compared to urban women. Pregnant women in Lesotho are expected to attend at least four focused or scheduled ANC visits before delivery, with the first visit at 8-12 weeks while the second visit is at 24-26 weeks. The third visit is at 32 weeks while the last visit is between 36 and 38 weeks.

A convenience population sampling was used to select all pregnant women attending ANC services at the two study sites over three months. This was based on a sampling frame created from the patients' daily check-up schedules and expected number of ANC attendees (Passer 2014:188-189). The total target population was estimated at 485 in the two study sites; comprising 285 participants in the peri-urban study site and 200 in the rural site, with the difference emanating from the geographic population densities of the two study sites (Grove et al 2014:344). Considering the estimated target population of 485, the sample size, which was calculated according to WHO sample size calculation guidelines, was 451.

1.8.3 The ANC literacy assessment tool

The ANC literacy tool, which tested for knowledge on ANC literacy, comprised four key ANC educational components and their respective domains recommended by WHO (2006). The components were namely: danger signs in pregnancy; true signs of labour; nutrition and preparedness for childbirth. The weight and scope of questions on each component were assigned based on the standard guidelines for knowledge assessments (Billings & Halstead 2016:372). The tool was translated to vernacular language (*Sesotho*) with the help of a language specialist.

The tool was divided into two sections, with the first section collecting participants' biographical and obstetrical data and the second assessing ANC literacy using short-answer and open-ended questions, as recommended by Ehrlich and Joubert (2008:107) for purposes of substantiating the validity of the assessment tool.

1.8.4 Data Collection

Data were collected over a period of three months, between March and May 2017. Questionnaires were administered to the study participants during their waiting periods at the hospitals. A total of 500 questionnaires were distributed to cater for nonresponses and incomplete questionnaires. Patients completed questionnaires on their own with the assistance of data collectors. A total of 479 questionnaires were collected and data were captured using the Microsoft Access (Microsoft, Richmond, USA) database tool.

1.8.5 Data analysis

Descriptive statistics of the demographic and obstetric data, inclusive of percentage, mean, and median were summarised (Passer (2014:52). The total score from the four ANC educational components was computed using Stata version 13 software (Stata Corporation, USA). Bivariate and multivariate analyses were performed to identify factors associated with having inadequate ANC literacy. Bivariate analyses were performed using Fischer's exact test and t-test for categorical and continuous variables, respectively, with inadequate ANC literacy as the outcome variable. Multivariate analyses of the factors that emerged significant ($p < 0.2$) in bivariate analyses were performed based on linear and logistic regression analyses for

continuous and categorical variables, respectively. The cut-off value for significance level in multivariate analysis was set at $p < 0.05$.

Data from open-ended questions which assessed participants' knowledge on preparedness for childbirth and sources of pregnancy-related information other than ANC health educators were analysed using quantitative content analysis. Data from the questionnaires were transcribed verbatim and captured in to Microsoft Access (Microsoft, Richmond, USA). Data were then exported to Microsoft Excel (Microsoft, Richmond, USA) to search for the emerging insights and themes.

1.9 STRUCTURE OF THE STUDY

The following chapters are presented in this report.

Chapter 1: Introduces the problem statement, presents a background of the study, outlines the study purpose and objectives. In addition, the chapter presents the significance of the study and paraphrases the study approach.

Chapter 2: Presents the theoretical framework which guided the study and analyses the literature pertinent for the study beginning with the concept of health literacy. Notable sub sections of the literature review include the transition from the historical perspective of antenatal care to the current one; coverage of ANC education in the African setting; approaches to ANC education; and tools in use for assessing health literacy.

Chapter 3: Outlines the research methodology, including the research design, sampling, data collection procedures and analysis. The chapter also outlines the validity and reliability of the research tool and ethical considerations important in the study.

Chapter 4: Presents the study findings and their interpretation, and discusses the implications of the findings.

Chapter 5: Concludes the study, limitations and presents recommendations based on the findings of the study.

1.10 SUMMARY

This chapter presented an introduction and overview of the study which included the background to the research problem, purpose of the study, objectives and the research questions. The chapter also summarised the theoretical framework, research methods and the structure of the dissertation.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

As is often necessary to understand a subject matter in depth (Polit & Beck 2012:55), this chapter presents a critical appraisal of the empirical and theoretical literature on ANC literacy. The major focus of this chapter is to define the basic concepts of health literacy relevant to pregnant women and review the most critical components of ANC education necessary for improving maternal outcomes in the context of Lesotho. This literature is also relevant to the practising midwives in the African setting. Literature searches, restricted to the most relevant articles written in English language, were conducted mainly in Google Scholar, EBSCO and PubMed databases based on pre-selected keywords, including but not limited to 'Antenatal care', 'antenatal care literacy', 'antenatal health education', 'awareness of danger signs of pregnancy' and 'health literacy.'

2.2 THEORETICAL FRAMEWORK FOR ASSESSING ANTENATAL CARE LITERACY

Formal ANC programmes were designed in Europe beginning in the first decades of the 20th century with the objective of improving maternal and prenatal outcomes for all women including those with low economic status (Anumba & Jivraj 2016:1). Historical accounts on the origins of ANC services by Lewis (1980:1), Nixon (1948:71) and Cameron, Gibberd, Hollins, Browne, Wrigley, Oxley et al (1935:435) relate how difficult it was in the early days of ANC services to promote this model of care. Of note, early objectives of ANC were obsessed with prevention of difficult labour, with pregnant women only visiting the hospital once or twice for solely the measurement of the pelvis and the size and presentation of the baby (Bourne & Nixon 1950:1). Bourne and Nixon (1950:1) also recount that testing urine for albumin was the only example of care of "function". Considerations for general health, personality and social surroundings of the pregnant woman, let alone the issue of ANC education, were uncommon. However, nowadays the core objective of antenatal care services include providing support for the pregnant woman (Anumba & Jivraj 2016:1). Health care

providers now prioritise the provision of advice, reassurance, ANC education and support for the woman to improve maternal outcomes (Anumba & Jivraj 2016:1).

Certainly, women who receive antenatal care have better pregnancy outcomes which lower maternal and perinatal mortality than those who do not (Anumba & Jivraj 2016:1). Thus, modern antenatal care provides a chance for health care providers to interact with pregnant women to prevent direct causes of maternal mortality and to reduce foetal and neonatal deaths related to obstetric complications (Anyia et al 2008:2). This enables women to make appropriate choices and decisions that contribute to optimum pregnancy outcomes and care of the new-born (Anyia et al 2008:2; Anumba & Jivraj 2016:1).

The WHO envisages that improving ANC education, can ensure a world where pregnant women have better maternal outcomes (WHO 2016:1). Thus, the WHO (2006:23), in its collection of standards for maternal and neonatal care, recommends the teaching of ANC educational components, particularly the four components that are critical for maternal health outcomes, namely:

- Knowledge of danger signs in pregnancy;
- True signs of labour;
- Nutrition in pregnancy and;
- Preparedness for childbirth.

Nevertheless, where resources permit, the WHO (2006:23) also encourages teaching of other important educational components including self-care; substance use; dangers of geophagia and physiological changes.

Figure 2.1 presents the core ANC educational components critical for maternal outcomes together with the sub-components, which formed the theoretical framework of this study. The educational components are further explained in the next section.

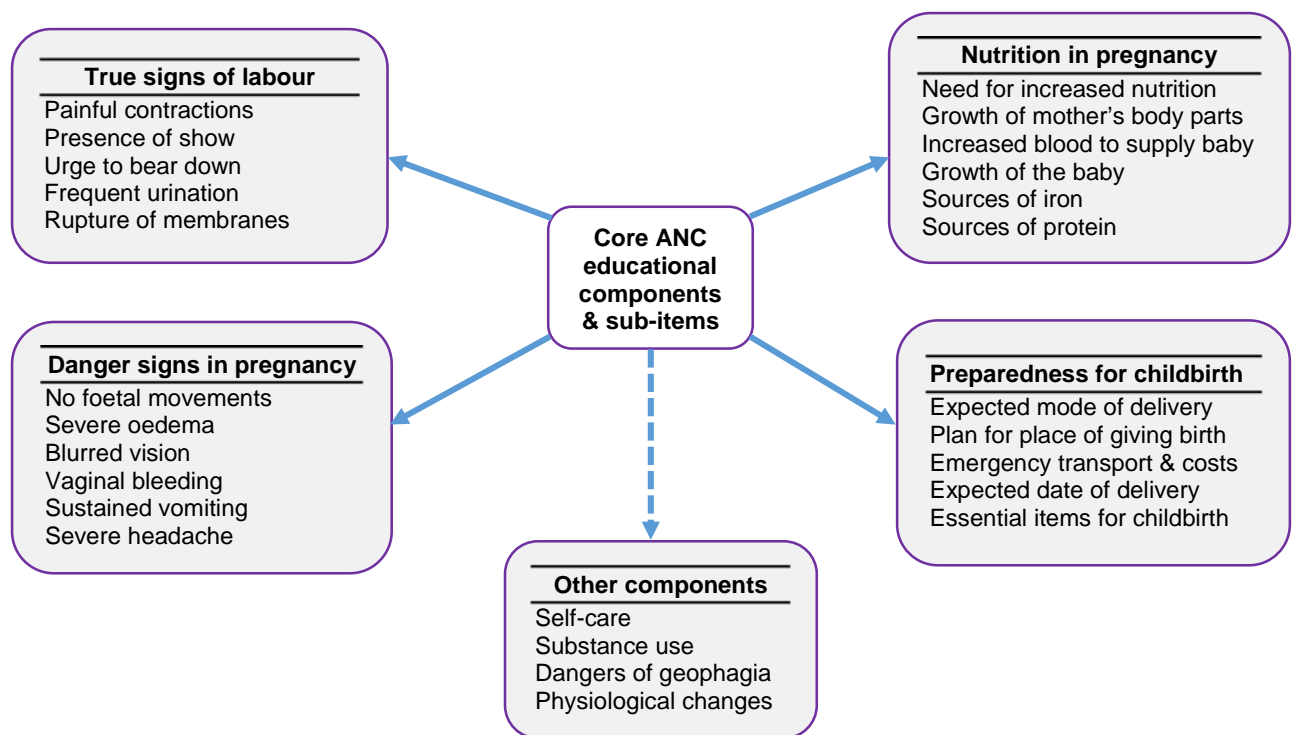


Figure 2.1 Theoretical framework of ANC educational components underpinning ANC literacy and better maternal outcomes

ANC=Antenatal care; geophagia means deliberate consumption of soil or clay.

Compiled from WHO (2010:92).

2.3 UNPACKING ANC EDUCATIONAL COMPONENTS UNDERPINNING ANC LITERACY AND BETTER MATERNAL OUTCOMES

2.3.1 True signs of labour

Knowledge of the true signs of labour is crucial for improving maternal outcomes. WHO (2010:92) notes that pregnant women should be aware of the signs indicating imminent birth. The true signs of labour include painful regular contractions which increase in intensity and lasts for about 60 minutes, breakage of bag of waters or rupture of membranes and presence of blood stained sticky vaginal discharge or show (WHO 2010:92). Knowledge of true signs of labour is crucial to enable pregnant women to distinguish between false and true signs of labour (see Table 2.1). As evident from the table, it is difficult to distinguish between true and false signs of labour, implying that quality ANC education is important to improve the awareness of these

signs. For example, the distinction between the duration of contractions in true and false labour is narrow.

Table 2.1 Contrasting between false and true signs of labour

False labour	True labour
Contractions often irregular but may be regular for one to two hours.	Contractions occur at regular intervals.
Interval between contractions stays the same.	Interval between contractions gradually shortens.
Contraction intensity and duration remain the same.	Contractions increase in intensity and duration.
Last not more than 20 seconds.	Last about 40 to 60 seconds.
Contractions frequently stop when the client ambulates or changes position.	Contractions continue and often become stronger when the client ambulates.
Contractions do not increase in frequency.	Contractions increase in frequency
Contractions eventually cease with controlled breathing.	Contractions are usually not stopped with controlled breathing or other controlled relaxation techniques, or sedation.
Cervix may soften but, does not efface or dilate.	Cervix softens, effaces and dilates.
Contractions not particularly uncomfortable.	Contractions are intense and uncomfortable.
Contractions are not accompanied by rupture of the membranes.	Occur along with leakage of fluid or rupture of the membranes.
Contractions occur only in lower abdomen.	Contractions stretch across upper abdomen or back, and may radiate to the front.

Adapted from White (2005:68) and Jarvis, Stone, Eddleman and Duenwald (2011:184)

2.3.1.1 Uterine contractions

As Oats and Abraham (2015:67) observe, the perception of pain during labour is increased if the woman is apprehensive and has little knowledge of the process of childbirth. ANC education should therefore conduct thorough education on childbirth to counteract this, particularly emphasising that pregnant women should expect painful abdominal pains or severe backache extending to the thighs, as the sign that labour is approaching (Oats & Abraham 2015:67). Women should know that the back pain is mainly due to contraction of the upper uterine segment and stretching of the vaginal,

pelvic and perineal tissues. Importantly, women should understand that the pain experienced during labour is necessary for efficient uterine contractions, which are a prerequisite for vaginal delivery (Arulkumaran 2016:54).

Women need to understand that the presence of regular contractions implies that they need to seek medical care as soon as possible to prevent unwanted home deliveries and poor maternal outcomes. This knowledge is critical for improving maternal outcomes. Further, for enhanced teaching of pains associated with labour, ANC educators need to understand uterine contraction parameters such as frequency, duration and relaxation time (see Table 2.2). Of note, these parameters are key to obstetric decision-making process including the need to administer contraction enhancing drugs such as oxytocin in cases where the contraction frequency is too low. Such knowledge, when delivered in a simple manner for easy comprehension by women, improves calmness and cooperation during labour. Equally important, women need to be aware that the absence of contractions often leads to caesarean sections (Arulkumaran 2016:54). In addition, it should be emphasized to pregnant women that uterine contractions are assessed by palpating the abdomen at regular intervals. This knowledge may promote cooperation during delivery particularly in women delivering for the first time (also known as primi-gravida).

Table 2.2 Understanding uterine contraction parameters

Parameter	Definition
Relaxation time	Time in seconds between the end of one contraction and the beginning of the next contraction
Contraction duration	Time in seconds between onset and offset of a contraction
Contraction amplitude	Maximum uterine pressure above basal tone, mmHg
Contraction surface	Surface underneath the contraction, compared with the basal tone, between onset and offset of the contraction, mmHg seconds
Contraction frequency	Number of contractions in 10 minutes period

Source: Arulkumaran (2016:54)

2.3.1.2 Presence of show

Given the thin distinction between true and false signs of labour, understanding the few clearer signs of true labour such as presence of show, is paramount. Presence of show, which refers to a mucous plug that seals the cervix during pregnancy and is dislodged during labour releasing blood stained mucous-like vaginal secretions (Wylie 2005:179), indicates the true onset of labour, which the woman should heed and seek immediate medical care. Rosdahl and Kowalski (2002:872) indicate that the mucous plug, known as operculum, occludes the cervix to prevent ascension of infection during pregnancy. The dilatation of the cervix during labour results in the shedding of the show through the vagina, accompanied by a small amount of blood (Wylie 2005:179). Women therefore observe blood stained mucous due to rupture of capillaries of the cervix.

2.3.1.3 Rupture of Membranes

Another unequivocal sign of true labour, which pregnant women should be cognisant of, is spontaneous rupture of membranes (ROM). ROM should be treated with urgency. Pregnant women should therefore notify a midwife if already admitted, or otherwise rush to hospital if not yet admitted. Women should be aware that ROM before engagement of labour often results in cord prolapse, a condition where umbilical cord descends into the birth canal ahead of the baby (Fraser & Cooper 2009:329). Cord prolapse is regarded one of the obstetric emergencies as the foetal circulation is often compromised (Fraser & Cooper 2009:329). ROM is also associated with ascending infections in to the uterus (Fraser & Cooper 2009:329).

Furthermore, ANC educators need to emphasise that it may be difficult for some women to differentiate ruptured membranes from urine, particularly if breakage of waters are trickling and not appearing as a gush of fluid (White 2005:68). Therefore, ANC educators also need to describe fully the properties of amniotic fluid during teaching sessions. White (2005:68), recommends that educators should encourage pregnant women to buy nitrazine paper to test for presence of amniotic fluid to clear confusion. Nitrazine paper turns blue in the presence of amniotic fluid (White 2005:68).

2.3.1.4 Urge to bear down

Advanced signs of true labour include the urge to bear down (Macdonald 2011:509). Pregnant women therefore need to understand that they need not wait until they experience the urge to bear down before seeking medical care. As Macdonald (2011:509), mentions, women usually feel the urge to push during the second stage of labour when the cervix is fully dilated but before the birth of the baby. Ideally, women should experience this symptom when they are admitted in maternity wards to prevent poor maternal outcomes. Upon encounter with this sign, women need to inform the midwife for assistance otherwise they might have unassisted delivery despite being in a health facility. Unassisted births are not uncommon in health care settings (Macdonald 2011:509).

In addition, women need to understand that the urge to bear down may be accompanied by behavioural change symptoms such as loss of control; panic; or disorientation (Macdonald 2011:514). Other symptoms include nausea; uncontrollable shivering and a need to scream (Macdonald 2011:509). Most importantly, women need to understand that they need to resist the urge to bear down until the cervical orifice is confirmed to be completely dilated by the midwife (Macdonald 2011:514). Downe and Dykes (2009:61), note that active pushing prior to full cervical dilatation causes oedema of the cervical orifice which inhibits vaginal birth of the baby. To control the urge to bear down, ANC educators should coach women to take panting breaths or exhale slowly through so-called pursed lips (Perry, Hockenberry, Lowdermilk & Wilson 2013:429).

2.3.2 Danger signs in pregnancy

Warning signs of abnormal pregnancy, including absence of foetal movements; vaginal bleeding; oedema; blurred vision; sustained vomiting; and premature rupture of membranes, are critical components of ANC education (WHO 2010:92). Improved knowledge of obstetric danger signs by pregnant women enhances early identification and management of obstetric complications thereby minimising poor maternal outcomes.

2.3.2.1 Absence of foetal movements

The absence of foetal movements may signify severe danger to the foetus including ruptured uterus and foetal death (Ward & Hisley 2015:322). Possible causes for

stoppage of foetal movements are not straightforward and may need to be included in ANC education sessions. Table 2.3 presents a criteria for diagnosis of loss of foetal movements. It is important that women are taught daily monitoring of foetal wellbeing including counting foetal movements. ANC educators need to emphasise that reduced or increased foetal movements should be reported at the medical care as soon as possible as it may signify underlying foetal distress which may result in foetal death. Reduced or absence of foetal movements may be due to several factors including *placenta abruptio* (WHO 2003:133). In a case of absent foetal movements, women should be instructed to drink two full glasses of water, rest on left lateral position for two hours then assess for foetal movements once again. If fewer than ten foetal movements are noted thereafter, they should report at the health care institution for evaluation (Ward & Hisley 2015:322).

Table 2.3 Diagnosis of loss of foetal movement

Sign and symptoms typically present	Signs and symptoms sometimes present	Probable diagnosis
Decreased/absent foetal movements	Shock	<i>Abruptio placentae</i>
Intermittent or constant abdominal pain	Foetal distress or absent foetal heart sounds	
Bleeding after 22 weeks gestation (may be brownish due to retaining in the uterus)	Tense/tender uterus	
Absent foetal movements and foetal heart sounds	Shock Abdominal distension or free fluid	
Bleeding (intra-abdominal bleeding (intra-abdominal and/or vaginal)	Abnormal uterine contour	Ruptured uterus
Severe abdominal pain (may decrease after rupture of the uterus)	Tender abdomen	
Decreased/absent foetal movements	Easily palpable foetal parts	
Abnormal foetal heart rate (less than 100 or more than 180 beats per minute)	Rapid maternal pulse	Foetal distress
	Thick meconium-stained fluid	
Absent foetal movements and foetal sounds	Cessation of pregnancy symptoms	Foetal death
	Symphysis-fundal height decreases	
	Uterine size decreases	

Source WHO (2003:133).

Importantly, pregnant women also need to understand and interpret the dangers signs of pregnancy in relation to pregnancy term (WHO 2010:90). For example, a pregnant woman should be aware that absence of foetal movement particularly in the third trimester may indicate foetal death; and severe abdominal pains every 20 minutes or contractions accompanied by vaginal bleeding in the first trimester implies miscarriage. For more details on danger signs in pregnancy for the different trimesters, see Table 2.4. Pregnant women should be aware that painful abdominal pains in the third trimester but before the time of delivery implies pre-term delivery (WHO 2010:90).

ANC educators should discuss appropriate measures to be followed in cases of each danger sign in pregnancy.

Table 2.4 Danger signs in pregnancy map and implications for pregnancy

Danger sign	First trimester	Second trimester	Third trimester	Implications in pregnancy
Severe abdominal pains or feeling of pressure or heaviness in the pelvic area before the time of delivery	X	X	X	Miscarriage (1 st and 2 nd trimesters) Premature birth (3 rd trimester)
Spotting and vaginal bleeding	X	X	X	Miscarriage
Severe persistent vomiting	X	X	X	Hyperemesis gravidarum; low birth weight
Painful urination	X	X	X	Urinary tract infection
Sudden gush of fluids from the vagina		X		Pre- term rupture of membranes; preterm birth
Reduced or absence of foetal movements		X	X	Foetal distress or foetal death
Oedema of the hands, face and peri-orbital oedema		X	X	Hypertension; pre-eclampsia
Severe headache				
Sudden weight gain				

Note: X denotes sign or symptom per given trimester. Adapted from Ricci and Kyle (2009:567).

2.3.2.2 Vaginal bleeding

Presence of vaginal bleeding accompanied by abdominal cramping should be stressed during ANC teaching sessions. Vaginal bleeding during the first two trimesters often indicate spontaneous abortion which is termination of pregnancy by natural causes before 20 weeks' gestation or miscarriage (Ward & Hisley 2015:322). Pregnant women should be informed that they need to avoid strenuous work and emotional stress as they are linked to miscarriages (Ward & Hisley 2015:322).

Although, miscarriage is common in most African settings, research in this field is inclined to the factors associated with miscarriages, paying little attention on prevalence rates. Nevertheless, pregnant women need to be aware of the signs and symptoms of miscarriages and avoid engaging in activities that are linked to it.

Ward and Hisley (2015:322) propose that pregnant women be taught about haemorrhagic disorders that are common in the third trimester. Pregnant women need to be aware that placenta previa, an implantation of the placenta in the lower uterine segment, near or over the internal cervical orifice may also cause vaginal bleeding (Ward & Hisley 2015:322). It is therefore critical that women are familiar of the signs and symptoms of placenta previa such as painless, light-red vaginal bleeding due to stretching of the lower uterine segment (Ward & Hisley 2015:322). Placental abruption, premature separation of a normally implanted placenta from the uterine wall may also occur causing vaginal bleeding. Women need to understand that vaginal bleeding due to placental abruption is often associated with pain (Ward & Hisley 2015:322).

2.3.2.3 Sustained vomiting

ANC educators need to emphasise the meaning of persistent nausea and vomiting during pregnancy. Pregnant women should understand that nausea and vomiting are common in the first trimester (Ward & Hisley 2015:322). However, in severe forms, may indicate underlying *hyperemesis gravidarum*, a pregnancy disorder characterised by persistent, uncontrollable nausea and vomiting beyond the 20th week of pregnancy associated with harmful effects to the mother and her unborn baby (Ward & Hisley 2015:322). Knowledge of its causes, signs and symptoms as well basic symptom management is critical to pregnant women. Pregnant women should be aware that *hyperemesis gravidarum* may be caused by multiple pregnancy or hydatidiform mole, growth of abnormal tissue which results from pregnancy hormones (Ward & Hisley

2015:321). Lamondy in Ricci and Kyle (2009:567) point out that *hyperemesis gravidarum* causes weight loss and dehydration which often results in preterm labour and small for gestational age babies.

Concerning management of *hyperemesis gravidarum*, pregnant women need to be aware that they may be hospitalised usually with good outcomes (Ricci & Kyle 2009:567). However, it is also important that pregnant women know that in severe cases, *hyperemesis gravidarum* causes complications such as encephalopathy, renal failure and fatty liver (Verberg, Gillott, Al-Fardan & Grudzinskas 2005:527). It is therefore critical that women seek medical care early. Whilst there is no comparable data in the African settings, in the USA, *hyperemesis gravidarum* is associated with 5% mortality rate of about 5% in the USA.

2.3.2.4 Severe oedema, blurred vision and headache

Pre-eclampsia, a syndrome characterised by increased systolic blood pressure above 140 mmHg systolic and 90 mmHg diastolic pressure on two occasions at least four hours apart after 20 weeks' gestation accompanied by proteinuria (Fraser & Cooper 2009:336), is one of the most common pregnancy complications during the second trimester. Discussing signs and symptoms of preeclampsia is therefore critical during ANC sessions. Pregnant women should be able to recognise early signs and symptoms of pre-eclampsia including severe headache, vision changes, and oedema so that they seek medical care early (Ward & Hisley 2015:322). ANC educators need to encourage bed rest in an effort to reduce blood pressure and alleviate the myriad of other problems associated with it (Ward & Hisley 2015:322).

Furthermore, ANC educators should highlight the need to avoid salty foods by pregnant women. Salty foods promotes accumulation of fluids in the extracellular compartments of the body causing pre-eclampsia (Ricci & Kyle 2009:326). Notably, pre-eclampsia is one of the leading causes of maternal death worldwide and is often referred to as maternal catastrophe in developing countries due to delayed medical attention (Gudu 2017:87). Delayed medical seeking may be attributed to failure to recognise signs and symptoms due to ignorance by pregnant women. WHO (2010:90), therefore recommends that ANC educators use appropriate teaching methods for improving awareness of danger signs in pregnancy. Gudu (2017:87), emphasises that providing ANC education in the socio-cultural context of the pregnant women improves

knowledge of danger signs of pre-eclampsia, thus reducing maternal deaths. Women with oedema should be informed to wear non-constrictive clothing, elevate the legs and assuming a side-lying position when resting to promote venous return (Ward & Hisley 2015:319).

Considering the severe consequences of pre-eclampsia, knowledge of the signs of pre-eclampsia by pregnant women cannot be over-emphasised. Pre-eclampsia is associated with low birth weight (Xiao, Sorensen, Williams & Luthy 2003:157). According to GOL (2016:4), about 7% of the babies in Lesotho weigh less than 2500g at birth. In South Africa pre-eclampsia occurs in 11.5% of all admissions, with the prevalence being higher in winter (Immink, Scherjon, Wolterbeek & Steyn 2008:36). Pregnant women in similar settings should therefore be vigilant of the signs and symptoms of pre-eclampsia particularly during winter months. Women with pre-existing hypertension and those with body mass index above 40, a factor associated with pre-eclampsia, need to be extra careful (Leung, Saaïd, Pedersen, Park, Poon & Hyett 2015:535).

2.3.2.5 Premature rupture of membranes

Rupture of membranes before 37 weeks' gestation or premature rupture of membranes (PROM) is another danger sign that pregnant women should be mindful of. Premature breakage of bag of waters as WHO (2010:98) puts it, accounts for one-third of preterm deliveries. Medina and Hill (2006:659) add that PROM leads to perinatal morbidity and respiratory distress syndrome. PROM also causes umbilical cord prolapse, placental abruption and foetal death (see Table 2.5) (Medina & Hill 2006:659).

ANC educators therefore need to discuss factors contributing to PROM. African pregnant women particularly, need to be aware of their vulnerability to PROM compared with other areas (Medina & Hill 2006:659). This knowledge may help pregnant women to avoid engaging in risky behaviours including smoking which increase vulnerability to PROM (Medina & Hill 2006:659). Women diagnosed with *polyhydramnios*, or multi-foetal pregnancy should also be watchful and have maternity pads ready in case of PROM (WHO 2010:98).

Table 2.5 Complications of premature rupture of membranes

Complications	Incidence (%)
Pre-term delivery	50 to 75
Respiratory distress syndrome	35
Cord prolapse	32 to 76
Chorioamnionitis	13 to 60
Abruptio placentae	4 to 12
Antepartum foetal death	1 to 2

PROM = premature rupture of membranes. Source: Medina and Hill (2006:659)

2.3.3 Nutrition in pregnancy

Additional nutrition prior to and during pregnancy and the six months post-partum is important to cater for the alterations in maternal metabolism and requirements for foetal development (Gopalan & Rao 1972:188). Tuffery and Scriven (2005:227) emphasise the need for counselling on nutrition and dietary intake to improve the eating habits of pregnant women. The same authors advocate that pregnancy-related nutrition education be introduced in formal school curriculums in low socio-economic backgrounds. ANC nutrition education, particularly in the African setting, where knowledge of nutrition is generally poor, should go beyond basic diet education such as emphasising on adequate energy, protein, vitamins and minerals, but rather should focus on trimester by trimester nutrition recommendations, outlining food sources of important nutrients, including foods pregnant women should stay away from (WHO 2016:3).

Given that iron, folate and vitamin A deficiencies are common during pregnancy in Africa (WHO 2016:35), food sources of iron, folate, vitamin A and other micro nutrients should be emphasised. Of note, Lammi-Keefe, Reese, Couch and Philipson (2008:24) note that vitamin A deficiency cause night blindness in about 19 million pregnant women in Africa and South-East Asia. Shortage of calcium, vitamin E, C, B6 and zinc, also linked to pre-eclampsia (Lammi-Keefe et al 2008:25), should be adequately addressed in ANC education. However, WHO (2016:35) emphasises the need for a balanced diet and cautions pregnant women against obesity and overweight, which may lead to poor pregnancy outcomes.

Pregnant women should be encouraged to consume diets that are rich in folic acid particularly in the first trimester, which is often referred to as a period of great nutritional

activity. Folic acid prevents neural tube defects such as spina bifida, wherein the tube has not closed caudally (Fraser & Cooper 2009:325). Consumption of food rich in iron should be emphasised to prevent anaemia. Anaemia refers to abnormally low levels of haemoglobin in the blood (Fraser & Cooper 2009:325). Notably, about 37% of pregnant women in Lesotho have anaemia (GOL 2016:4). Severe anaemia is an important contributing factor to maternal deaths due to haemorrhage during childbirth (GOL 2016:4).

Pregnant women should be warned not to consume uncooked eggs, shellfish or undercooked poultry due to the risk of contracting listeria and salmonella (Tuffery & Scriven 2005:227). Intake of foods such as tuna should also be restricted to no more than four medium sized cans per week as it is linked to poor development of the foetal nervous system (Tuffery & Scriven 2005:227).

Most studies on nutrition teaching concentrate on increasing the expectant mother's weight to reduce poor maternal outcomes such as low-birth weight infants and perinatal morbidity and mortality. Nutrition teaching directed toward preventing obesity in the infant has not received the same attention, despite health statistics attesting to the growing incidence of childhood obesity (Mogan 1984:104). All the same, there is little evidence on maternal awareness of recommended nutrition during pregnancy.

Barriers to effective nutrition should be explored and discussed during teaching sessions. Nutrition is affected by culture, physiological, social or emotional constraints. Physiological constraints such as persistent nausea and vomiting usually inhibit food consumption during the first trimester, which compromises the nutritional status of pregnant women (Tuffery & Scriven 2005:227).

2.3.4 Preparedness for childbirth

Given that women with pre-determined birth plans are more likely to give birth under supervision of trained health care personnel, the need to develop a birth and emergency preparedness plan, particularly identifying a birth place and potential birth assistants, should be emphasised (WHO 2006:68). However, Miltenburg, Roggeveen, Roosmalen and Smith (2017:13) caution that the recommendation that all pregnant women should give birth at healthcare settings or under supervision of a health care professional has to be approached with care in low resource settings with few healthcare personnel hence requires careful consideration of contextual factors

influencing birth preparedness. The authors note that there may be a discrepancy where increased demand for facility-births exceed the infrastructure and human resources. The authors warn that such a mismatch may endanger prevailing fragile trust the community has in the formal healthcare system or result in increased mistreatment of women giving birth at facilities.

WHO (2010:84) recommend the use of open questions for probing cultural and socio-economic barriers to the development of birth plans. WHO (2010:84) also encourage ANC educators to involve family members and the community in development of birth plans. Community involvement simplifies transport arrangements during emergency birth thus reducing unwanted home deliveries (WHO 2010:84).

The need for discussing the factors influencing preparedness for childbirth during ANC teaching sessions is also imperative (WHO 2010:84). ANC educators need to explore cultural and religious beliefs that may affect preparation of birth plans. Miltenburg et al (2017:13) found out that some pregnant women do not engage in activities for preparedness for child birth with the belief that pregnancy outcomes are predetermined and are 'in God's hands', therefore there is no need to prepare for birth. This view highlights the gaps on preparedness for child birth in ANC teaching sessions. In settings where women are not allowed to make decisions, ANC educators need to encourage partner involvement in ANC visits to enable development of birth plans (WHO 2010:84).

WHO (2010:87) further suggests that ANC educators review the birth preparedness plans using a checklist (see the checklist in Figure 2.2). Importantly, the checklist has itemised birth preparedness indicators which simplifies the review process. The use of checklist may help midwives to identify challenges to birth preparedness.

BIRTH AND EMERGENCY PLAN CHECKLIST	
Names.....Date.....Age.....	
Address.....Expected date of delivery.....	
Nearest health facility.....	
Names and address of the birth attendant.....	
Birth preparedness indicator	Response and suggestions
Identified a skilled birth attended identified to assist during birth	
Identified a preferred place of birth	
Identified alternative birth place in case of emergency	
Identified companion during birth, 24 hours post birth and during emergencies	
Transport to health centre identified	
Estimated overall cost of birth care and cost of emergency birth	
Has essential supplies for birth	
Identified possible blood donor	

Figure 2.2 Checklist for determining birth preparedness in pregnant women
Source: (WHO 2010:89)

2.3.5 Other ANC educational components

2.3.5.1 Self-care practices during pregnancy

ANC health education should also include the teaching of other important but non-core educational components such as self-care (WHO 2006:47). Self-care activities aim at maintaining healthy pregnancy. Self-care practices include maintaining good nutrition, managing stress and depression, maintaining appropriate weight, exercises and avoiding high-risk behaviours such as smoking, substance use and unsafe sex (Boonpongmanee, Zauszniewski & Morris 2003:75). It is important to note that

pregnancy, although not a disease condition, may co-exist with medical conditions such as HIV, hypertension and diabetes mellitus (Boonpongmanee et al 2003:75), which account for depression among pregnant women. It is therefore necessary for pregnant women to know how to manage these medical conditions. Given that about 22.9% pregnant women in Lesotho are HIV positive (Mugomeri, Musa & Chatanga 2016:10), teaching pregnant women how to manage personal emotional stress and depression is therefore important.

WHO (2010:75) recommend teaching pregnant women to rest when tired, not to lift heavy objects, and not take over-the-counter medications. Religious and socio-cultural barriers to effective self-care should also be explained to pregnant women. WHO (2010:75) highlights the need to involve family members in group discussions to brainstorm the needs of pregnant women related to self-care. Family members may value the suggested views and support pregnant women to adequately care for themselves. In addition, family members may participate in house chores if they know why pregnant women need to rest.

According to WHO (2016:45), ANC education should further warn women about parasitic infections such as helminthiasis that are associated with iron-deficiency anaemia and can be transmitted through geophagia or the practice of eating soil during pregnancy (Salam, Haider, Humayun & Bhutta 2015:43).

2.3.5.2 *Smoking and alcohol use*

Despite the dangers, rates of smoking in pregnancy remain high worldwide (Bailey 2015:824), thus calling for emphasis of this component in ANC teachings. Harmful effects of smoking on pregnancy are widely appreciated. These include preterm birth and foetal malformations (Fraser & Cooper 2009:184). However, Bailey (2015:824) note that resistance to the acquisition of such knowledge among the smokers remains. The authors note that women who are aware of the harmful effects of smoking continue to smoke. Thus, there is a clear need for ANC educators to explore the gap between knowledge, attitudes and refraining from smoking among pregnant women. On contrary, Bailey (2015:824) reports that the proportion of pregnant smokers reduced from 44 per cent at the beginning of pregnancy to 42 per cent and concludes that education does improve knowledge on smoking though slightly.

Regarding alcohol use, alcohol consumption in pregnancy is associated with low birth weight, preterm birth, and small-for-gestational-age infants (Fraser & Cooper 2009:184). Alcohol consumption in early pregnancy causes miscarriage. Despite the dangers of alcohol and smoking, research evaluating awareness of their effects among pregnant women is minimal.

2.3.5.3 *Physical activity and exercises*

Given the limited time available for health care workers to discuss exercises issues with women in primary care settings, ANC check-up remains the only practically place where benefits of exercises are discussed (Harvey & Ricciotti 2014:80). Harvey and Ricciotti (2014:80) maintain that ANC is a better avenue for improving antenatal physical activity. Benefits of exercises during pregnancy include reduced excessive antenatal weight gain, improved course of delivery, reduced chances of developing gestational diabetes mellitus and pre-eclampsia (Harvey & Ricciotti 2014:80). Exercises also reduce physical discomforts associated with pregnancy.

Harvey and Ricciotti (2014:80) observe that women engage in less physical activity throughout pregnancy. The authors highlight that the general apathy by women to engage in exercises may be attributed unawareness of the care providers of their duty to promote physical lack of confident to provide teachings on antenatal physical activity. The latter reason may contradict the view that health care providers are informative and poised to increase women's understanding and behaviours related to antenatal physical activity. However, little is known about current attitudes, beliefs, and practices among providers on antenatal physical activity.

As Leiferman, Gutilla, Nicklas and Paulson (2016:1) put it, there is a lack of discussion about exercises during antenatal sessions. Leiferman et al (2016:1), confirm that pregnant women in their study reported improved physical activity after receiving information about exercises during ANC classes. On contrary, other pregnant women reported learning about physical activity from friends and family often confusing as it discourages exercising (Leiferman et al 2016:1). ANC educators therefore have a significant role in communicating evidence based benefits of exercises during pregnancy (Leiferman et al 2016:1).

2.3.5.4 *Physiological changes in pregnancy: a guide to ANC educators*

Pregnant women usually experience physiologic changes to meet the demands of the developing foetus, maintain homeostasis, and prepare for birth and lactation (Simpson & Creehan 2008:59). Simpson and Creehan (2008:59), note that physiologic changes during pregnancy result from the interplay of multiple factors, including the influences of hormones as well as mechanical pressures exerted by the growing foetus and enlarging uterus. An understanding of the normal physiologic changes of pregnancy is essential to pregnant women to discriminate between normal and abnormal states. This section reviews physiologic changes during pregnancy to provide baseline information to guide midwives in conducting ANC teaching sessions. The review presents changes occurring in the cardio vascular, respiratory, digestive, renal and skin.

- **Cardiovascular system**

The cardiovascular system undergoes profound alterations during pregnancy (Simpson & Creehan 2008:59), some of which have impact on pregnancy outcome (see Table 2.6). Pregnant women need to understand these changes to improve ANC outcomes. The most important change is increased cardiac workload normally manifested by increased heart rate. However, other changes are also important.

The alterations in the structure of the cardiovascular, blood volume, cardiac output, and vascular resistance to accommodate the increased maternal and foetal circulation requirements are the most important to note. These changes result in some pregnant women experiencing increased heart rate and peripheral oedema. Increased palpitations, light headedness and decreased tolerance for physical activity are the reasons why pregnant women should be informed about the need to reduce extraneous work. Further, Simpson and Creehan (2008:59) note that women with underlying cardiovascular diseases need to even be more mindful of strenuous work due to their inability to accommodate the cardiovascular changes associated with pregnancy, which may result in pregnancy complications. However, pregnant women in developing countries often have to disregard workload recommendations due to lack of knowledge and in some cases having no option but to perform heavy duty work. This implies that ANC education in these countries needs to emphasize on effects of heavy work during pregnancy.

Table 2.6 Pregnancy associated cardiovascular changes and risks in pregnancy

Parameter	Change	Implication
Heart rate	Increases	Increased cardiac workload
Blood volume	Increases	
Plasma volume	Increases	
Red cell mass	Increases	
Cardiac output	Increases	
Stroke volume	Increases	
Systemic vascular resistance	Decreases	
Colloid oncotic pressure	Decreases	
Diastolic blood pressure	Decreases	

Adapted from Simpson and Creehan (2008:61)

- **Renal system**

The renal system, which excretes maternal and foetal waste products, undergoes structural and functional changes during pregnancy. Changes in renal function accommodate the increased metabolic and circulatory requirements of pregnancy (Simpson & Creehan 2008:61). Pressure placed on the renal system and the relaxant effects of progesterone on vascular tissue enhance the ability of the renal system to accommodate the cardiovascular changes of pregnancy.

During pregnancy, the amount of glucose filtered by the kidneys increases due to the increased glomerular filtration, causing sticky urine due to presence of glucose in urine. Thus, pregnant women should not be worried that sticky urine may be a sign of diabetes mellitus (DM). Women should understand that, the renal tubules increase reabsorption of glucose from the tubules back into the blood, but are unable to match the increase in filtered glucose resulting in glycosuria (Simpson & Creehan 2008:61).

Glucose tolerance test, which is important during pregnancy, is usually normal in most pregnant women with glycosuria, suggesting that this glycosuria is secondary to altered renal function and not abnormal carbohydrate metabolism (Simpson & Creehan 2008:68). This knowledge may enable pregnant women suspecting gestational diabetes (GDM) to request for serum glucose evaluation instead urine

glucose evaluation as urine test may give false positive results which may lead to improper management and poor maternal outcomes.

Rossouw, Hall, Mason and Gebhardt (2017:26) indicate that the prevalence of GDM is rising. The authors point to several reasons, first, becoming pregnant at older age and obesity. Rossouw et al (2017:27) observe that obesity is worsened by high-calorie diets and decreased levels of physical activity and suggest that women with pre-existing DM should be aware of the signs and symptoms to take precautionary measures such as ultrasound scans for detection of foetal abnormalities. DM is associated with foetal abnormalities such as macrosomia and Hydrops foetalis, with the former being the common foetal abnormality (see Table 2.7) (Rossouw et al 2017:29). In their study, Rossouw et al (2017:27) found that about 28.1% of the still births were from mothers with Type I DM, while 64.9% and 7.0% had Type II DM and GDM respectively. Pregnant women in similar settings should therefore be informed about these effects for proper preventive measures.

Table 2.7 Abnormalities associated with diabetes mellitus during pregnancy

Fetal abnormality	Estimated incidence (%)
Macrosomia	13
Bilateral cleft lip and palate	1
Hepatosplenomegaly	1
Hypertrophied intra-ventricular septum (post-mortem)	1
Hydrops fetalis	2
Sacral dysgenesis	1
Rocker-bottom feet and short nasal bone	1

Source: Rossouw et al (2017:29)

In addition, pregnant women should be aware that protein excretion is also increased because the increased filtered load of protein exceeds the tubular re-absorptive capacity causing proteinuria (Simpson & Creehan 2008:68). Thus, urinary protein measurements should not be considered abnormal until 24-hour urine values greater than 300 mg are reached. Levels higher than 300 mg in 24 hours may indicate renal disease, pre-eclampsia or urinary tract infection (Simpson & Creehan 2008:68).

- **Changes in the gastrointestinal system**

The occurrence of gastrointestinal (GI) changes in pregnancy needs to be emphasised to pregnant women. Pregnant women need to understand that they may experience increased appetite and consumption of food during pregnancy to meet increased nutritional requirements (Simpson & Creehan 2008:72). Women should be informed about uncomfortable GI symptoms including heartburn, constipation, nausea and vomiting in pregnancy (NVP) for easy adaption during pregnancy. Simpson and Creehan (2008:72) note that nausea and vomiting during pregnancy is a significant topic for discussion in ANC teaching sessions as it results in depression in most women worldwide. Important topics for discussion about NVP include its gestational

timing and management. Bryer (2005:1) reports that NVP is most common in the first trimester

It is therefore critical that ANC educators share remedies for relieving nausea and vomiting with pregnant women during teaching sessions. Such knowledge may prevent complications associated with NVP such as birth defects, low birth weight, and preterm delivery and still birth (Bryer 2005:1). ANC educators should inform women to avoid foods that trigger nausea, eat frequent small meals and add ginger to their meals for reducing nausea (Bryer 2005:1).

Midwives need to emphasise the need to eat a balanced meal not the foods that pregnant women are able to eat. This is critical as some women may be eating one type of food they find appealing thus compromising their immunological status and that of the baby. Nordin, Broman and Wulff (2005:175) recommend that pregnant women should avoid oily and spicy foods during the spells of NVP. Regarding the causes of NVP, pregnant women need to understand that several hormones mostly human chorionic gonadotropin (HCG) have been implicated in NVP. Progesterone and estrogen, which increase dramatically in pregnancy have also been implicated in NVP. However, there is paucity of evidence about nausea and vomiting in pregnancy in most African setting including Lesotho.

The other important GI change that need to be called to the attention of pregnant women is the change in olfaction particularly during early pregnancy, where formerly unnoticeable smells become unpleasant (Nordin et al 2005:175). Nordin et al (2005:175) point out that about 93% of the women report a change in taste perception in the first trimester and that pregnant women have increased odour intolerance compared to non-pregnant women. These alterations in taste and smell often lead to food cravings and avoidance of some foods such as meat, fruits and fish which are critical for proper development of the foetus (see Table 2.8) (Simpson & Creehan 2008:69).

Pica, an extreme craving usually for non-nutritious foods or items need to be discouraged during pregnancy (Coad & Dunstall 2011:277). Coad and Dunstall (2011:277) indicate that pregnant women usually report a desire to eat non-nutritive foods such as coal, soap, toothpaste and ice are common. In the USA, black women often eat laundry starch, chalk and clay during pregnancy (Coad & Dunstall 2011:277).

Despite the practise of eating non-nutritive items during pregnancy being common in the African setting, there is little evidence in this research domain. ANC educators therefore have an important role of discouraging such habits during ANC teaching sessions.

Table 2.8 Aversive and craved foods in selected African countries

Country	Commonly aversive and craved food items	Prevalence of Aversion and Cravings %
Ethiopia	Wheat; coffee ; wheat; bread; meat sauce; potato; cheese; milk; fatty meat; kale; orange; banana; wheat; roasted wheat; linseed	65-72%
Tanzania	Rice; meat; fish; eggs; beans; tea; stiff porridge; sweets meat; yoghurt; oranges; plantains; soft drinks; amaranths; sweet potato leaves; lady's finger; fried potatoes; sweets; cowpeas; milk	73%
Nigeria	Alcohol; plantains; cassava-based food; yam-based food; fish and fish products; meat and meat produce; milk and milk products; non-alcoholic beverages; bean-based foods; fruits; cereal and cereal-based food; vegetables; cassava-based food; alcohol	60%
South Africa	Meat; fatty foods; coffee and tea; fish; eggs; cooked foods; cabbage; tinned fish; fried foods; fruits; sour food; sweet and confectionery; cold drinks; sour milk; fresh milk; oranges	67-84%

Adapted from Patil, Abrams, Steinmetz and Young (2012:398-400)

• Skin and breasts

A consensus that antenatal education support women in developing their understanding of physiological changes highlights the need to focus on the physical changes associated with pregnancy. Evidence suggest that effective engagement of women in discussions about physiological changes promotes women particularly primi-gravida to adapt well throughout pregnancy hence reduce emotion trauma (Simpson & Creehan 2008:74). Pregnant women need to know that they may develop striae gravidurum (Fraser & Cooper 2009:185), which is associated with notable changes on the breasts. Breasts increase in size and become nodulanty to prepare for lactation. Nipples become more erectile and veins are more prominent, with areolar pigmentation and Montgomery's follicles — the sebaceous glands located in the

areola, hypertrophy (Fraser & Cooper 2009:185). Striae may develop as the breasts enlarge. Colostrum, a yellow secretion rich in antibodies, may leak from the nipples (Fraser & Cooper 2009:185) (Refer to Table 2.9).

Table 2.9 Time table for breast changes during pregnancy

Physiological breast change	Pregnancy term
Prickling, tingling sensation due to increased blood supply	3-4 weeks
Increase in size, painful, tense and nodular due to hypertrophy of the alveoli.	6-8 weeks
Veins become bluish and more visible	
Muntgomery's tubercles become prominent on the areolar. The pigment around the nipple darkens and become more sensitive.	8-12 weeks
Colostrum can be expressed	16 weeks
Colostrum may leak from the breast	Late pregnancy

Source: Fraser and Cooper (2009:186)

- **Respiration system**

The growing uterus and the increased production of progesterone hormone, which causes the lungs to function differently during pregnancy, need to be emphasised in ANC teaching sessions. This knowledge may help women adapt well throughout pregnancy hence improve maternal outcomes. Pregnant women need to understand that the amount of space available to house the lungs decreases as the uterus puts pressure on the diaphragm and causes it to shift upward above its usual position hence increases respiration rate and depth (Pillitteri 2013:234). As a result of these changes, the women's breathing becomes more diaphragmatic than abdominal and may encounter shortness of breath (Pillitteri 2013:234). Coad and Dunstall (2011:271) indicate that maternal respiratory effort is increased to meet the increased metabolic demands of maternal and foetal tissues.

Women also need to be aware that they may encounter nasal congestion and that they should not relate congestion to allergy or a cold. ANC educators need to discourage over-the-counter cold medications or antihistamines in an effort to relieve congestion. In addition, pregnant women should be aware that nasal congestion often leads to epistaxis or nose bleeding and changes in the tone of the voice (Ricci & Kyle 2009:295). It is critical that women are made aware that these alterations will revert back to their pre-pregnant state at the end of the pregnancy.

2.4 A REVIEW OF THE DEPTH AND SCOPE OF ANC EDUCATION IN THE AFRICAN SETTING

Antenatal education is not a new concept. As Smyth, Spence and Murray (2015:336) put it, it is considered an fundamental part of maternity care. However, the available body of evidence on core educational components such as knowledge of danger signs in pregnancy, knowledge of true signs of labour, knowledge of proper nutrition in pregnancy and preparedness for child birth is minimal. Available studies in this research area focus mostly on knowledge of danger signs. Nevertheless, knowledge about danger signs in pregnancy is important for better maternal outcomes. Pembe, Carlstedt, Urassa, Lindmark, Nyström and Darj (2010:4) assert that informing pregnant women on pregnancy danger signs and assisting them to develop an emergency contingency plan, particularly women in rural areas, is important for decreasing geographical and financial barriers, thus improving maternal outcomes. Pembe et al (2010:4), affirm that pregnant women's awareness of potential pregnancy danger signs is expected to decrease the amount of time between the occurrence of pregnancy complications and the identification of the complication.

Hoque and Hoque (2011:955), in South Africa observe that most ANC clinics fail to consistently inform women about the danger signs of pregnancy. The associated reasons include inadequate consultation time, indifferent attitudes or inadequate knowledge of health care workers, lack of simplicity in the information delivery system, or could a combination of all these factors. ANC education should therefore discuss information on danger signs in pregnancy at every ANC visit using simple language and that comprehension be evaluated as part of health education strategy (Hoque & Hoque 2011:955). Apparently, Gambia teaches more content than the other African countries indicated above and may have better levels of ANC literacy.

The view that ANC educators are poorly performing with regard to provision of health education is supported by Pembe et al (2010:4). The authors note that in Tanzania, most workers in antenatal care settings fail to provide health education, particularly on danger signs of pregnancy. This finding suggests a need for proper supervision and monitoring of ANC workers. The findings also suggest collection of evidence based practice on ANC education, which may be done monthly by the management team.

The objective of building confidence for childbirth and parenting, developing social support networks, and influencing healthy behaviour in pregnant women is critical (Gagnon & Sandall 2007:3). However, the inevitable existence of differences in coverage of ANC educational components by region or country implies that ANC literacy of pregnant women differs from place to place.

The Demographic Health Surveys (DHS) of African countries namely Lesotho, Namibia, South Africa, Swaziland and Zimbabwe reveal limited coverage of the recommended educational components during ANC teaching sessions. As depicted in table 2.10, ANC health education in these countries, focusses on the signs of pregnancy complications (GOS 2008:119; GOZ 2012:18; GON 2014:103; GOL 2016:125; GOSA 2016:19).

Table 2.10 Educational components covered during ANC teaching sessions in selected southern African countries

Educational component	Country
Signs of pregnancy complications	Swaziland
Signs of pregnancy complications	Namibia
Signs of pregnancy complications	Zimbabwe
Signs of pregnancy complications	South Africa
Signs of pregnancy complications	Lesotho

Compiled from: GOL (2016:125), GON (2014:103), GOSA (2016:19), GOS (2008:119) and GOZ (2012:18).

2.5 KNOWLEDGE OF DANGER SIGNS IN PREGNANCY IN THE AFRICAN SETTING

Knowledge of danger signs in pregnancy in the African setting is certainly deficient. A study by Coleman (2014:203-209) in South Africa reveals that knowledge about the danger signs and symptoms of pregnancy complications is low among pregnant women attending antenatal care. Duysburgh, Ye, Williams, Massawe, Sie, Williams et al (2013:1498), note that in Burkina Faso, about 58% of the pregnant women attending ANC are not able to mention even one danger sign with confidence. In Tanzania and Ghana, this indicator is estimated at 30% and 22%, respectively. The authors observe that vaginal bleeding and severe abdominal pain are the signs most discussed during ANC sessions. In Ethiopia, Amenu, Mulaw, Seyoum and Bayu (2016:1) also concluded that most women attending ANC are not knowledgeable about obstetric danger signs. Similar data on pregnant women's knowledge levels on danger signs in pregnancy in most African settings, including Lesotho, are not available.

A study by Kabakyenga, Östergren, Turyakira and Pettersson (2011:5) in Uganda, observe several factors associated with knowledge of danger signs and preparedness for child birth. These include geographic place of residence, socio-economic status and number of ANC visits attended (see Table 2.11 on the next page). The authors observe that women from rural areas had opaque knowledge of danger signs of pregnancy. Hoque and Hoque (2011:955) reiterate that women from rural areas have lower levels of knowledge on pregnancy danger signs despite the higher rate of ANC attendance, while women from high socio-economic status were more prepared for child birth than their counterparts. The findings by Kabakyenga et al (2011:6) imply that ANC educators need to pay special attention to women from rural areas and those from low socio economic setting. Hoque and Hoque (2011:955) observe that women with knowledge of at least one key danger sign during pregnancy were more likely to be prepared for childbirth than those without this knowledge.

Table 2.11 Factors associated with awareness of danger sings in pregnancy

Socio-demographic factors	Obstetric factors
Age below 35	More than one ANC visits
Married status	More than one delivery
High educational level	Receiving ANC education more than once
Working women	

Adapted from Pembe, Urassa, Carlstedt, Lindmark, Nyström and Darj (2009:8)

Mutiso, Qureshi and Kinuthia (2008:275) and Hailu, Gebremariam and Alemseged (2010:1) conclude that pregnant women in Kenya and Ethiopia have low levels of knowledge of pregnancy danger signs respectively. Regarding examples of danger signs known to pregnant women, Pembe et al (2009:3) note that only a few women (9.6%) know that vaginal bleeding during pregnancy is a danger sign. Notably, pregnant women in Gambia receive ANC education on diet and nutrition; family planning; danger signs in pregnancy; signs of anaemia; and signs of hypertensive disorders (Anyanwu et al 2008:3).

2.6 EXPLORING BARRIERS TO EFFECTIVE ANC EDUCATION

Exploring the current challenges to effective ANC education is critical for improving ANC education. Of the challenges, timing of the teaching sessions is the most important. Ho and Holroyd (2002:74) point out that most teaching sessions are conducted during the day when most women are at work. This inhibits them from attending the teaching sessions as recommended. More importantly, it makes it difficult for partners to attend. A flexible time or night duty sessions should therefore be developed for working mothers and their partners.

Timing of the teaching sessions with regard to pregnancy term is another important factor. Ho and Holroyd (2002:74) report that the teaching sessions often begin around the seventh month which is usually inappropriate time for teaching some ANC educational components. For example, teaching about nutrition in pregnancy in the last trimester is not critical than in the first trimester as it is considered a critical period for development of the foetus hence a need for increased proper diet (Ho & Holroyd 2002:74).

Obscure knowledge of danger signs of pregnancy may also be blamed on time and limited number of health care workers (von Both, Fleßa, Makuwani, Mpembeni & Jahn 2006:1). von Both et al (2006:1) note that the time taken during ANC educational sessions is not enough. The authors indicate that the average time a health care provider spends with first time ANC visitor is about 15 minutes instead of 45 minutes recommended by WHO. The 15 minutes are often inadequate for comprehensive ANC educational sessions (von Both et al 2006:1).

Ho and Holroyd (2002:74) note that, lack of fixed teaching programmes, where the same group of women are enrolled in teaching sessions up to delivery time may be posing a challenge to ANC education. The lack of clear women enrolment in ANC teaching sessions according to their pregnancy terms makes it difficult for proper planning of the teaching sessions as well as the follow-up teaching as each women join and leave as they feel appropriate (Ho & Holroyd 2002:74). Poor counselling of the pregnancy danger signs is considered one of the reasons for poor awareness of danger signs among women who attend antenatal care (Pembe et al 2010:4).

Multiple roles of ANC workers may also be influencing ANC education negatively. WHO (2006:23) recommends that pregnant women who seek ANC be provided with comprehensive services including medical history, blood pressure monitoring, urine test, weighing, blood test, tetanus toxoid vaccination as well as physical examination and pregnancy monitoring. These activities, though equally important may compromise provision of ANC education particularly in low resource settings with poor staffing. Lack of awareness about the duty to provide education is another factor. Wright, Biya and Chokwe (2014:5) observe that some midwives are not aware that provision of health education is one of their responsibilities.

Cultural beliefs also affect awareness of danger signs in pregnancy (Miltenburg et al 2017:13). A review by Miltenburg et al (2017:13) reveals that despite being able to recognise danger signs during pregnancy, women often do not seek care because of cultural beliefs. For example, in Tanzania, obstructed labour, retained placenta and eclampsia are associated with adultery (Miltenburg et al 2017:13). ANC educators therefore need to consider the influence of culture on ANC education and develop culturally sensitive behaviour change programmes. Nevertheless, more evidence is needed on the influence of culture on ANC education in the African setting.

One of the challenges to improving awareness of danger signs is seeking maternal services from General practitioners (GPs). Moodley (2011:135-137), in South Africa notes that seeking ANC services from GPs compromise ANC knowledge as most of the GPs do not provide ANC education. The same practice may be threatening ANC literacy in Lesotho where about 50% of the pregnant women seek obstetric services from GPs (GOL 2016:19).

2.7 AN ACCOUNT OF THE APPROACHES TO ANTENATAL CARE SERVICES AND ANTENATAL CARE EDUCATION

Whereas the historical ANC approach antenatal care services known as high-risk approach determined the number of ANC visit depending on pregnancy risk, the current approach has shifted towards the focused approach, which uses a generic number of ANC visits commensurate with pregnancy term (Lincetto et al 2006:53).

In the high-risk approach, women categorised as 'high risk' based on the predetermined criteria, should visit for ANC check-up more than the 'low risk' ones. The major challenge with this approach is its inability to accurately predict pregnancy risk (Lincetto et al 2006:53), particularly for women staying in distant places from healthcare settings.

Focused antenatal care (FANC), which is a more comprehensive and goal oriented approach to ANC, emphasises at least four ANC visits (Lincetto et al 2006:53), during which thorough screening of pregnancy risks such as anaemia and HIV status, and the teaching of ANC educational components, is conducted (Lincetto et al 2006:53).

Approaches to ANC health education differ across the globe. Nevertheless, the major challenge with the approaches to ANC health education in the African setting is lack of standardised guidelines, poor access to teaching aides such as multimedia tools and inadequacy of tools for evaluating comprehension of ANC components (Wilmore, Rodger, Humphreys, Clifton, Dalton, Flabouris et al 2015:75).

Given the lack of standard ANC teaching guidelines, ANC teaching sessions vary in length, focus and content (Renkert & Nutbeam 2001:382; Al Otaiby 2013:1). It is therefore not surprising that ANC education in most countries is inconsistent. Teaching methods for ANC also differ by country and regions within the same country (Wilmore et al 2015:75). While most ANC educators use a group approach, some opt for one-to-one teaching method (Al Otaiby 2013:1). Both the two teaching approaches have

pros and cons depending on the characteristics of the audience. For example, applying group approach to women of heterogeneous educational backgrounds may have challenges. In addition, learning capacity may differ in the group. Al Otaiby, 2013:1 recommend that educators consider adult learning techniques for group teaching sessions with different learning capacities.

To improve the knowledge of danger signs, Coleman (2014:203-209) proposes the use of pregnancy danger signs mobile architecture framework, where pregnant women are taught about pregnancy danger signs through mobile phones. However, the proposal by Coleman (2014:203-209), though sensible, may not be suitable in low socio-economic settings such as Lesotho as it excludes pregnant women without access to smart mobile phones. Such a framework may also need consistent software updates, which call for expert services often lacking in most developing countries. Naeeni, Lotfi, Farid and Tizvir (2016:1) advocate for use of compact disks (CDs) as compared to face to face approaches for teaching pregnancy danger signs. The authors highlight that CDs save time. Seemingly, use of the latter approach may benefit health care settings with poor human resources such as Lesotho.

Despite the advantages of using media and communication technologies in delivering ANC education, (Wilmore et al 2015:75), the lack of media tools such as brochures and multimedia projectors in most ANC teaching settings in Africa is a challenge. For example, community-based strategy consisting of radio messages regarding obstetric complications improved awareness of obstetric complications in Guatemala (Perreira, Bailey, de Bocalletti, Hurtado, de Villagrán & Matute 2002:19). The use of such media in improving ANC education is underexplored. Wright et al (2014:4) suggest use of pictorials for teaching ANC educational components including dangers signs, dangers of alcohol and nutrition in pregnancy as depicted in Table 2.12. Another challenge is lack of tools for evaluating comprehension of the taught ANC components (Anyia et al 2008:5; Wilmore et al 2015:76). More research is therefore critical in this area particularly in the African settings.

Table 2.12 Using pictorials for teaching antenatal educational components: a guide to ANC educators

ANC educational component	Ability to interpret the picture
Show a picture of a stressed woman	Ask for interpretation and implication
Show a picture indicating no alcohol	
Show a picture indicating no un-prescribed medication	
Show a picture indicating no smoking	
Show a picture of healthy food habits	
Show a picture of pregnant woman exercising	

Adapted from Wright, Biya & Chokwe (2014:4).

2.8 THE CONCEPT OF HEALTH LITERACY: A REVIEW

Given that a strong association exists between women's literacy and their use of reproductive and maternal health services and that better health literacy is positively correlated with higher ANC literacy (Chandrashekar, Rao, Nair & Kutty 1998:206; Kateja 2007:29), a review of the concept of literacy in relation to women and health literacy is therefore pertinent to understanding the notion of ANC health literacy and its significance to maternal outcomes. Kateja (2007:29) outlines that general literacy transcends every sphere of women's lives, arguing that literacy is directly related to the status of women, their decision-making power and capability to access health care services. On the other hand, Berkman, Davis and McCormack (2010:3) define health literacy as the individuals' capacity to obtain, process and understand basic health information in order to make appropriate health decisions and access healthcare services. Sørensen, Van den Broucke, Fullam, Doyle, Pelikan, Slonska et al (2012:78) refer to health literacy as a concept related to lifelong health motivation and disease prevention in order to enhance and sustain the quality of life. The other definitions of the concept of health literacy as presented in Table 2.13.

Nutbeam (2008:264) identifies three types of health literacy, namely, (1) functional health literacy; (2) interactive health literacy; and (3) critical health literacy. Functional health literacy refers to basic skills in reading and writing to be able to function efficiently in everyday situations. Interactive health literacy refers to advanced

cognitive and social skills which can be used to actively participate in everyday activities to extract information and derive meaning from different forms of communication and to apply new information to changing circumstances. Critical health literacy refers to advanced cognitive skills which together with social skills can be applied to analyse information and use this information to control over life events (Nutbeam 2008:264).

Importance of identifying patients' health literacy levels cannot be over emphasised. Identifying patients with potential health literacy problems is considered 'the sixth vital sign' (Wolf, Gazmararian & Baker 2005:1946-1952). Nurses should therefore screen patients for low health literacy levels at every health care encounter (Dickens & Piano 2013:52).

Health literacy help patients to understand complex health information and treatment decisions (Sørensen et al 2012:79). Patients usually carry specific tasks such as evaluating health care information for credibility and quality. Patients are also required to analyse risks and benefits of health care interventions. In some incidences patients are required to calculate drug dosages. In order to accomplish these tasks, individuals need to possess a certain degree of health literacy (Sørensen et al 2012:79).

In addition, Kumar, Mangalathil and Choudhary (2014:304) highlight that health literacy helps patients to articulate their health concerns and describe their symptoms. Moreover, patients with average to high health literacy are able to understand spoken health care advice and treatment directions (Kumar et al 2014:304). This helps patients to ask questions related to their care. Furthermore, health literacy helps patients when searching for health information on the internet. This is important since internet is an alternative source of health information today. Lastly, health literacy plays a crucial role in self-management of chronic diseases such as diabetes mellitus hence reduces health care costs (Kumar et al 2014:304).

Table 2.13 Definitions of health literacy

Definition	Source
The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.	Ratzan and Parker (2000)
The capacity of individuals to obtain, process, and understand the basic information and services needed to make appropriate health decisions.	Nutbeam (2000)
Personal, cognitive, and social skills that determine the ability of individuals to gain access to, understand, and use information to promote and maintain good health. These include such outcomes as improved knowledge and understanding of health determinants and changed attitudes and motivations in relation to health behaviour, as well as improved self-sufficiency in relation to defined tasks.	Nutbeam (2008)
Individual's attributes that explains and predicts one's ability to access, understand and apply health information in a manner necessary to successfully function in daily life and within the health care system.	Schwartzberg, Cowett, VanGeest and Wolf (2007)
The ability to function in the health care environment and depends on characteristics of both the individual and the health care system. An individual's health literacy is context specific and may vary depending upon the medical problem being treated, the health care provider, and the system providing care.	Baker, Williams, Parker, Gazmararian and Nurss (1999)

Source: Berkman et al (2010).

2.9 TOOLS FOR MEASURING HEALTH LITERACY AND THEIR SUITABILITY IN THE AFRICAN SETTING

2.9.1 Tools for measuring health literacy

Various tools have been used to measure general health literacy in and out of Africa. Arguably, there is no gold standard for measuring health literacy as there is no single definition of the concept. Unfortunately, the tools commonly used to assess general health literacy have limited application to ANC health literacy. Nevertheless, the tools offer informative tips for the assessment of health literacy. The tools include: Rapid Estimate of Adult Literacy in Medicine (REALM), Test of Functional Health Literacy in Adults (TOFHLA) and the Newest Vital Sign (NVS).

- **Rapid Estimate of Adult Literacy in Medicine**

Rapid Estimate of Adult Literacy in Medicine (REALM) is a health literacy measurement tool, designed primarily for public and community health centres, which asks participants to read a list of 66 medical terms, arranged in ascending order of difficulty and scores them on their reading proficiency and comprehension (Berkman et al 2010:9-19; How 2011:121). The REALM uses common medical terms of human anatomy and illness to test word recognition (How 2011:121). Patients are expected to be able to read in order to participate effectively in their own health care. How (2011:121), notes that raw REALM scores are often converted into four reading grade levels: third grade or less, fourth to sixth grade, seventh to eighth grade, and ninth grade and above.

The REALM can be administered and scored in under three minutes by personnel with minimal training. Points are awarded for correct pronunciation (range, 0–66). These scores are correlated with reading grade estimation. A score of less than 61 corresponding to a less than ninth-grade reading level in USA, less than 44 corresponding to a less than sixth-grade reading level and less than 19 corresponding to a less than third-grade reading level (How 2011:121).

Rapid Estimate of Adult Literacy in Medicine- Revised version (REALM-R), another tool for measuring health literacy ask patients to pronounce 11 selected medical words (Bass, Wilson & Griffith 2003:1037). The words are arranged with descending order of difficulty, with the first three words not counted in the results. Bass et al (2003:1037), warn that if the patient takes more than five seconds on a word, they should be encouraged to move on to the next word to avoid shame. Patients with a score of 6 or less should be considered to have poor health literacy. However, the REALM-R may not be suitable in non-English speaking populations as it is only available in English.

- **Test of Functional Health Literacy in Adults**

Test of Functional Health Literacy in Adults (TOFLA) refers to a tool designed using health-related materials to assess reading and numerical competencies on healthcare (Weiss et al 2005:288). It is regarded as being more reliable and valid than other health literacy tools (Weiss et al 2005:288).

The TOFHLA consists of a set of written instructions and numerical information and requires up to 22 minutes to administer (How 2011:121). The test consists of three

diverse passages followed by a 50-item reading comprehension section that requires participants to fill in the 50 omitted words from a passage based on multiple-choice options. There is also a 17-item numerical ability test that assesses the ability to comprehend prescription labels, blood glucose test results, clinic appointment slips, and financial information (How 2011:121). The TOFHLA is scored on a scale of 0–100. Patients are categorised as having adequate health literacy to navigate the health system if the TOFHLA score is 75–100, marginal health literacy if it is 60–74, and inadequate health literacy if the score is 0–59 (Weiss et al 2005:288).

Short form of test of functional health literacy in adults (S-TOFHLA) is also available for measuring health literacy levels. How (2011:122), states that S-TOFHLA includes 36 items from two different passages, including four items assessing numerical ability. The test usually takes 7 to 12 minutes to administer. How (2011:122), further indicates that patients are categorised as having adequate health literacy to navigate the health system if the S-TOFHLA score is 23–36, marginal health literacy if it is 17–22, and inadequate health literacy if the score is 0–16 (How 2011:121).

- **The Newest Vital Sign**

The newest vital sign (NVS) is a 6-item tool assessing understanding of healthcare directions through testing capacity to read and comprehend information on a nutrition label (Weiss et al 2005:514; Reeves 2008:288). The tool is usually completed in about three minutes (Weiss et al 2005:516). The authors observe that, high levels of health literacy are influenced by younger age, high attainment of formal education, health class participation, and healthier body mass index when using this tool. Notably, the English version of the newest vital sign is considered the best multi-item measure compared to the other tools (Powers, Trinh & Bosworth 2010:76).

Barry, Clarke, Jenkins and Patel (2013:835), note some important differences in the speed of administration, with NVS being regarded as being quicker to administer compared to S-TOFHLA (Chesser, Keene Woods, Smothers & Rogers 2016:10).

2.9.2 Challenges with the current health literacy tools

The limited vocabulary and their approach have been criticised for failing to capture health literacy adequately (Weiss et al 2005:516). For example, none of the 66 medical terms used in REALM relates to ANC literacy. Wolf et al (2005:289) report that the tools also lack cultural sensitivity and are biased toward certain population groups.

Wolf et al (2005:289) conclude that currently the field does not have a comprehensive instrument for measuring health literacy. Therefore, the need for researchers to study their study populations and contextualise the tools appropriately, cannot be overemphasized. Thus, the limited application to ANC health literacy implies that new ANC educational assessment tools are needed.

2.9.3 Usage of tools for measuring health literacy in the African setting

Currently, only a few studies have assessed general health literacy in the African context. In South Africa, two studies used the REALM scale (Dowse, Lecoko & Ehlers 2010:464-471; Wasserman, Wright & Maja 2010:1). However, Dowse et al (2010:464-471) argue that REALM, in its current format, is unsuitable to be used to assess health literacy in Africa. It is therefore not surprising that Lori and colleagues, in 2014, created their own qualitative tool (questionnaire) to assess health literacy of pregnant women in Ghana (Lori et al 2014:438). Overall, the evidence suggests that in order to measure health literacy researchers need to design and contextualise their tools to the population under investigation. How (2011:121) argues that the tools may not be suitable in other settings as they were developed in the USA with scores that corresponded to the English language ability of their education system. He recommends that other culturally different countries with different education healthcare systems need to develop and validate own health literacy tools to identify their local predictive factors to identify factors associated with inadequate health literacy. How (2011:121) alludes to the work of Tokuda, Doba, Butler and Paasche-Orlow (2009:112), who developed and validated their own 15-item Japanese Health Knowledge Test and identified that low levels of income was married to low health literacy (How 2011:121). However, How (2011:122) recommends that health literacy tools should be culturally sensitive and population specific to minimize or eliminate intangible effects such as feeling of shame in patients.

2.10 SUMMARY

Chapter 2 reviewed the pertinent concepts of antenatal care important in the study of ANC education. The chapter also outlined the theoretical framework for the study and further explained the concept of health literacy focusing on health literacy tools that are currently used in research.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter describes the framework, or as Holloway and Wheeler (2013:14) put it, the chapter outlines the methods and procedures for conducting the study, including study setting, research design, study population and sampling, data collection and analysis. The chapter also outlines ethical considerations and measures taken to ensure that reliable data was collected.

3.2 STUDY SETTING

Lesotho is a small landlocked mountainous country of about 1.8 million people which is completely surrounded by South Africa (GOL 2010:17). The country is divided into 10 administrative districts with the capital city Maseru. Each district has, in addition to clinics, at least one district hospital which serves as a referral centre for the diagnosis and treatment of diseases.

The health systems of Lesotho consists of tertiary, district referral hospitals, urban filter clinics and rural health centres (Mwase, Kariisa, Doherty, Hoohlo-Khotle, Kiwanuka-Mukiibi & Williamson 2010:11). The health centres, which are major centres for ANC services in the rural areas, are supposedly the first tier of contact within the formal health care system in the rural areas. Comparatively, the quality of rural health services in terms of accessibility is lower than urban health services due to a number of factors including mountainous terrain. To address this challenge, major renovations of the health centres, were recently carried out through the support of the Millennium Challenge Corporation (MCC), a development partner from the United States of America, which seeks to strengthen health systems in developing countries (BenYishay & Tunstall 2011:1). However, challenges with the number of healthcare workers including for ANC services and equipment for provision of ANC education remain.

Lesotho's education system, which is important for improving general health literacy levels, has three successive mandatory levels – beginning with seven years of primary, followed by five years of secondary education and thereafter, tertiary

education of one's choice (GOL 2001:10). Although not mandatory for admission into tertiary institutions within the country, students may also proceed to Advanced Level studies post-secondary education. To improve the general literacy levels, Lesotho introduced free primary education policy in the year 2000 (Morojele 2012:38). Free primary education has enabled nearly all children to attend primary school with the enrolment of 80% between the year 2000 and 2002 (Morojele 2012:38).

The study was conducted at two purposively selected study sites; one in a rural, mountainous sparsely populated geographical area of the country predominantly characterised with low economic status, lower levels of education and comparatively poorer access to health services. The other site was in a peri-urban area with better economic status, higher levels of education and better health services. Lesotho's geographic landscape naturally divides the country into three economic zones, namely, urban, peri-urban and rural.

ANC services in most hospitals of the country entail the provision of antenatal education by the nurses to all pregnant women in the waiting areas. The antenatal education is mostly presented in lecture format covering nutrition, self-care, danger signs, and signs of labour—hence each woman receives the identical information regardless of her gestational age.

3.3 RESEARCH DESIGN

A quantitative assessment of the levels of ANC literacy was adopted for the study. Quantitative research relies primarily on numerical data in order to understand the phenomenon under study (Grove et al 2014:211). This approach was found to be suitable for measuring ANC literacy and the associated variables. Burns and Grove (2005:27) reiterate that quantitative research collects numerical data to describe and measure variables of interest to the researcher.

The cross sectional quantitative study assessed the levels of knowledge on ANC educational components for the first time in the selected settings, and the variables associated with low levels of ANC literacy. The study was limited to knowledge of four ANC educational components recommended by the WHO (Lincetto et al 2006:55). This study, which was within the framework of functional health literacy assessments, (Nutbeam 2000:266), focused on assessment of ANC literacy.

The study collected data using short answer and used quantitative content analysis from open-ended questions based on a cross sectional questionnaire that assessed ANC literacy of pregnant women. Passer (2014:146) states that in cross-sectional studies, a phenomenon of interest is studied over a short period of time.

3.4 STUDY POPULATION AND SAMPLING

3.4.1 Sampling rationale

Due to resource limitations and time constraints, a rationale use of the available resources was required to achieve the study objectives. Therefore, the study population comprised pregnant women in peri-urban and rural zones of the country. Pregnant women in these zones were selected because of their higher vulnerability to maternal mortality compared to urban women. The study targeted pregnant women who were attending their first and subsequent ANC visits at the rural and peri-urban hospitals in Lesotho. Pregnant women in Lesotho are expected to attend at least four focused or scheduled ANC visits before delivery, with the first visit at 8-12 weeks while the second visit is at 24-26 weeks. The third visit is at 32 weeks while the last visit is between 36 and 38 weeks. This was the population that had characteristics of interest to the researcher (Passer 2014:51).

The study used convenience population sampling of all pregnant women attending ANC services stratified by the relative population sizes at the two study sites over three months based on a sampling frame created from the patients' daily check-up schedules (Passer 2014:188-189), taking into consideration willingness to participate in the study and the selection criteria.

The sample size was calculated according to WHO sample size calculation guidelines with two assumptions, namely an error margin of 5% at 95% confidence interval and minimum response rate of 50% (Raosoft 2014). The size of the target population was estimated at 485 in a three months period of data collection at the two hospitals, with the rural study site expected to have 200 while the peri-urban site was expected to have at least 285 pregnant women. Using the WHO online formula (See the formula below) for calculating sample sizes for health surveys (Raosoft 2014) and the total study population of 485, the minimum sample size required was 430 at the two hospitals.

$$x = Z(c/100)^2 r(100-r)$$

$$n = N x / ((N-1)E^2 + x)$$

$$E = \text{Sqrt}[(N - n)x / n(N-1)]$$

where N is the population size, n = the sample size and E = margin of error, r is the fraction of responses of interest, and $Z(c/100)$ is the critical value for the confidence level c .

An additional 10% or 43 women was added to increase the reliability of the sampling, which gave a total of 474. A total of 451 women comprising 300 participants in the peri-urban study site and 151 in the rural site, met the selection criteria and were included in the final analysis. This sample was considered to be reasonably representative for the study population (Grove et al 2014:344).

3.4.2 Selection of the study participants

3.4.2.1 Inclusion criteria

Polit and Beck (2012:259) emphasise the need for researchers to specify the characteristics that delineate the study population. In line with this recommendation, the following criteria of study participants were considered:

- pregnant women who attended their ANC check-ups during data collection at the two hospitals were selected for this study;
- pregnant women who received ANC health education;
- and pregnant women who were able to speak and write Sesotho.

3.5 DESIGN OF THE ASSESSMENT TOOL

The tool, which tested for knowledge on ANC literacy, comprised four key ANC educational components based on the ANC educational components recommended by WHO (2006). The domains were namely (1) danger signs in pregnancy; (2) true signs of labour; (3) nutrition; and (4) preparedness for childbirth. The weight and scope of each component was assigned based on the standard guidelines for knowledge assessments (Billings & Halstead 2016:372). The tool was translated to vernacular language (*Sesotho*) with the help of a language specialist.

The tool was divided into two sections, with the first section collecting participants' biographical and obstetrical data and the second assessing ANC literacy using short-answer and open-ended questions. Ehrlich and Joubert (2008:107) recommend the use of short-answer, open-ended or multiple-choice questions to substantiate the validity of assessment tools or questionnaires.

The short-answer section of the tool quantitatively assessed the level of ANC literacy while the open-ended section formed the content analysis. The short-answer section, which determined the levels of knowledge on ANC literacy, had the scores ranging from 0 to 30. Arbitrarily, inadequate knowledge was defined as failure to obtain a score of at least 50% in the short-answer section of the tool; marginal ANC literacy score ranged from 15 to 24 while a score of 25-30 was defined as high ANC literacy.

3.6 MEASURES TO ENSURE DATA VALIDITY AND RELIABILITY OF THE STUDY

The study prioritised face, content and internal validity. By definition, validity determines whether an instrument accurately measures the phenomenon which it is intended to measure (Brink, 2006:167). Babbie (2007:146) also defines validity as the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration. Face validity, which refers to the quality of an indicator including the desirability of questions that are framed in the respondents' vernacular language (Saks & Allsop 2012:180; Tiran 2012), was ensured by consulting an expert team on the suitability of the questions in the assessment tool towards the key educational components of ANC (see Annexure B) and by translating the questionnaire to Sesotho.

Content validity, which ensures a representative coverage of the tool (Polit & Beck 2006:392) and relevancy of the content (Passer 2014:266), was improved by using standard guidelines, peer reviewed midwifery articles and text books to build the questionnaire and evaluate the participants' responses.

3.6.1 Validation of the assessment tool

A Delphi approach was used to ensure validity of the questionnaire. The Delphi technique is often used to obtain the most reliable consensus from experts through a series of questionnaires. The Delphi technique was used to achieve an agreement on content of the assessment tool (Keeney, McKenna & Hasson 2010:10). The Delphi

technique occurred in two stages. Firstly, the questionnaire was administered to the expert team comprising nine midwifery nurses. The team was invited to evaluate the content validity of the ANC assessment tool. The experts' midwifery clinical experience ranged from two to three years. The experts had educational levels ranging from first degree in nursing to Master's Degree in Nursing. Notably, one member of the expert team had enrolled for a Doctor of Philosophy or a doctorate level degree.

The four ANC educational domains were explained to the experts. The experts were asked to rate each item on the assessment tool for its relevance using a 5-point scale, with 1 being "not relevant", 3 being "Neutral", and 5 being "very relevant". They were also requested to provide their suggestions about the item description. Preliminary analyses of the items on the questionnaire allowed the researcher to choose items for the next round of the Delphi. Keeney et al (2010:6-10) allude that the rounds or stages in a Delphi continues until a consensus is reached.

In the second round, scale items were administered along with recommendations from the expert team. The content validity of the ANC assessment tool was confirmed. All the experts responded that each item on the tool was either relevant or very relevant to test ANC literacy of the participants in the real world. In addition, the tool was found to have internal consistency reliability (Cronbach's alpha coefficient=0.9536). Cronbach's alpha coefficient was used to test internal consistency of the questionnaire. Internal consistency speaks to the extent to which all items on an instrument measure the same variable (Brink 2006:164).

In order to ensure internal validity, participants' ANC literacy was measured on participants who had once received ANC health education. Passer (2014:295) defines internal validity as the extent to which one variable brings an effect on another variable.

3.6.2 Pilot testing of the assessment tool

The ANC literacy assessment tool was pilot tested with 10 participants at each of the two hospitals. The purpose of the pilot testing was to determine the consistency of the tool in measuring the attributes it is designed to measure (Passer 2014:122) and to improve the tool before commencing the main data collection. The researcher trained two data collectors for the period of one week prior to the pilot study. Most participants reported that the questions were clear and had responded to the questions

appropriately. The responses from the 10 women in the pilot study were included in the main study.

3.7 DATA COLLECTION

Data were collected over a period of three months, between March and May 2017. Questionnaires were administered to the study participants during their waiting periods at the hospitals.

A total of 500 questionnaires were distributed to cater for nonresponses and incomplete questionnaires. Patients completed questionnaires on their own with the assistance of data collectors. A total of 479 questionnaires were collected and data were captured using the Microsoft Access database tool. Of the captured questionnaires, 28 were spoiled or incompletely filled. Thus, 451 valid questionnaires remained and were suitable for analysis after data cleaning.

3.8 VARIABLES CONSIDERED IN THE ASSESSMENT OF ANC LITERACY AND THEIR DEFINITIONS

The study assessed demographic, economic and obstetric characteristics that had the potential to influence ANC literacy in Lesotho. The demographic characteristics, herein referring to the existing condition at the time of data collection, included age, marital status, living arrangements, and level of education. Age was an important variable owing to its significance as a risk factor to obstetric complications, living arrangements for their potential contribution to literacy while the level of education was considered to have a direct impact on ANC literacy. The household monthly income, representing the total income from the husband and wife if applicable, was the only economic characteristic considered. Obstetric variables included gravidity, parity and trimester at first ANC visit. Gravidity, which referred to the number of pregnancies carried to age of viability (Tiran 2012:91) and parity, meaning the number of viable babies borne by a woman (Tiran 2012:159) were selected because of their significance to ANC literacy. The other obstetric variables, also selected for their importance to ANC literacy, were number of ANC visits, number of ANC education received, number of miscarriages, having an emergency transport plan and having identified a place for giving birth. Likewise, all these variables, referred to the prevailing condition at the time of data collection.

To assess ANC literacy of the participants, knowledge of dangers signs in pregnancy, true signs of labour, preparedness for childbirth and knowledge of nutrition in pregnancy were purposively considered and the outcomes benchmarked with standard guidelines.

Regarding knowledge of danger signs, participants' responses were benchmarked with Fraser and Cooper (2009), one of the key authors of midwifery literature, and ANC national guidelines for Lesotho adopted from WHO (2006) guideline. For true signs of labour, participants responses were benchmarked with Davies and Deery (2013) and (Peate & Hamilton 2013), yet other key authors of midwifery works. In addition, indicators for childbirth preparedness, including awareness of date, mode of delivery, emergency transport and essential items for a mother going for delivery, were informed by Shields and Candib (2010). Furthermore, participants' knowledge of nutrition in pregnancy was benchmarked with the recommendations by Lammi-Keefe, Reese, Couch & Philipson, (2008) and those of the national ANC guidelines of Lesotho. Other indicators for childbirth preparedness assessed were knowledge of the contents of baby layette, mother's essential items for delivery and expected response to rupture of membranes. These were evaluated based on the contextual health education given to pregnant at ANC sessions. Pregnant women are usually told to buy bunting suits, hats, socks, vests, nappies and baby wrappers as basic contents of baby layette. Women are also told to bring menstrual pads which are used for post-delivery care. In addition, women are taught to put a clean pad, note the time of rupture and the colour of the draining liquid during rupture of membranes (Fraser & Cooper 2009:330).

Sources of pregnancy-related information outside of ANC health educators were also explored to determine the role of media and basic education in informing young women about pregnancy.

3.9 ANALYSIS OF ANC LITERACY OUTCOMES AND THE ASSOCIATED VARIABLES

Data from the completed questionnaires were captured using Microsoft Access database application. Data were cleaned and checked for completeness before analysis and were analysed using Stata version 13 software (Stata Corporation, USA). Descriptive statistics, such as percentage, mean, and median were applied for

demographic data analysis Passer (2014:52) indicates that descriptive statistics enhance better organisation of data. The total score from the four ANC educational components was computed electronically using Stata. Regarding preparedness for childbirth and nutrition in pregnancy, where the participants had to select correct answers from the given responses, participants' responses were marked to determine the proportion of participants with low scores on individual responses. This helped to determine educational components with knowledge gaps. Bivariate and multivariate analyses were performed to identify factors associated with having inadequate ANC literacy. Bivariate analyses were performed using Fischer's exact test and t-test for categorical and continuous variables, respectively, with inadequate ANC literacy as the outcome variable. Multivariate analyses of the factors that emerged significant ($p < 0.2$) in bivariate analyses was performed based on linear and logistic regression analyses, for continuous and categorical variables, respectively. The cut-off value for significance level in multivariate analysis was set at $p < 0.05$.

Data from open-ended questions which assessed participants' knowledge on preparedness for childbirth and sources of pregnancy-related information other than ANC health educators were analysed using quantitative content analysis. Stommel and Wills (2004:23) define content analysis as the method of studying and analysing a given body of discourse in a systematic, objective and quantitative manner for the purpose of measuring variables. Data from the questionnaires were transcribed verbatim and captured in to Microsoft Access by the researcher and one data collector. Peer debriefing contributed to the trustworthiness of data. Peer debriefing involved discussion and exploration of specific aspects of the inquiry with the data collectors. This is recommended to ensure honesty and identification of biases, and to provide an opportunity to develop next steps in the emerging design of a project (Pera & Van Tonder 2005:57-58).

Data were then exported to Microsoft excel to search for the emerging insights and themes. All the transcriptions were reviewed individually for general impressions. Data were coded and grouped into conceptual categories to facilitate abstraction and analysis. Common themes were identified.

3.10 ETHICAL CONSIDERATIONS

The study proposal was reviewed by the Research Committee of the University of South Africa (UNISA) and permission to conduct the study was granted by the Ethics Committee of the Ministry of Health, Lesotho in January 2017 (see Annexure G and H). Furthermore, permission to conduct the study was also granted by the authorities of the hospitals included in the study.

The study observed standard ethical principles for conducting medical research as recommended by the Helsinki protocol of 2013 (World Medical Association 2015). Autonomy, one of the ethical principles, which means freedom to make choices in life Burkhardt and Nathaniel (2002:41), was ensured in the study. For this principle, participants were informed of their right to withdraw from the study at any point. Some of the proponents of this principle, Speziale, Streubert and Carpenter (2011:66), emphasise the need for autonomy for study participants. Written informed consent, another aspect of autonomy Pera and Van Tonder (2005:46), was requested from each participant.

In the spirit of doing good to the participants, otherwise known as beneficence (Passer 2014:74), the researcher explained the benefits of the findings of the study to the participants and ensured that the participants were comfortable throughout the study. For the principle of justice in the study Ehrlich and Joubert (2008:33), participants were treated equally despite the different backgrounds. Furthermore, data were collected in privacy and all information treated as confidential. The right to withhold information perceived personal Neuman (1997:264), was also observed. To observe the principle of anonymity Pera and Van Tonder (2005:50), fictitious codes were used instead of participants' names.

3.11 SUMMARY

Chapter 3 presented the research methodology of the study. This chapter discussed the research design, research methods which included the setting, population and sample selection as well as the inclusion and exclusion criteria of participants. The sample frame, accessible population and data collection process were outlined. The chapter also presented validity, reliability and ethical considerations.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF THE RESULTS

4.1 INTRODUCTION

The analytic phase is the fourth-major phase of a quantitative research (Polit & Beck 2012:57). The phase includes analysing of data and interpreting of the results. The first section presents results from short and long questions while the second section presents discussion related to the findings of the study. The short questions assessed knowledge on four ANC educational domains namely; danger signs in pregnancy, true signs of labour, preparedness for childbirth and nutrition in pregnancy. The long questions explored for knowledge on preparedness for childbirth regarding content of baby layette and mother items needed for delivery and actions to be taken when membranes rupture. The other question explored sources of pregnancy related information outside ANC health educators.

4.2 DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

Table 4.1 presents the demographic characteristics of the 451 participants who were included in the final analysis. The ages of the participants (see Figure 4.1), representing the childbearing age in the study population, ranged from 16 to 47 years with a median of 24 years. The most common 35% (n=153) childbearing age group was the 21-25 years. Notably, the 16-20 category, associated with high risk pregnancy, was the second most common 23% (n=104) age group. In addition, the proportion of women aged 36 and above, also associated with high risk pregnancy, was about 8% (n=36).

Regarding marital status, majority of the women 82.0% (n=370) were married while the remainder had never been married 16.6% (n=75) or divorced (0.9%) (n=4). At the time of data collection, more than half the number of the participants were exclusively staying with their husbands 57.2% (n=258), biological parents 22.6% (n=102) or mother-in-law 12.9% (n=58). Only 7.1% (n=32) stayed alone, a characteristic regarded as a risk to pregnancy.

Regarding residential place, more participants 68.3% (n=308) resided in the peri-urban areas compared to remote rural areas 31.7% (n=143). Concerning education,

most of the women had attained secondary education 60.7% (n=274) as their highest level of education followed by primary 25.9% (n=117) level and tertiary 11.1% (n=50). Only 1.3% (n=6) had no formal education.

Table 4.1 Demographic characteristics of the participants

Characteristics	Frequency	Percent (N=451)
Marital status		
Married	370	82.0
Never married	75	16.6
Divorce	4	0.9
No response	2	0.5
Family income (monthly average) ^a		
<1000	387	85.8
1000-2500	37	8.2
2501-5000	20	4.4
5001-8000	7	1.6
Living arrangements ^β		
Husband	258	57.2
Biological parents	102	22.6
Mother in law	58	12.9
Alone	32	7.1
No response	1	0.2
Residential place		
Peri-urban	308	68.3
Rural	143	31.7
Highest qualification		
Primary	117	25.9
Secondary	274	60.7
Tertiary	50	11.1
No formal education	6	1.3
No response	4	0.9

^aMaluti currency (about M13.00=1 United States Dollar); ^β living arrangements indicates the person staying with the participant at the time of data collection.

4.3 OBSTETRIC HISTORY OF THE PARTICIPANTS

Table 4.2 presents obstetric history of the participants. Majority of the women 77.2% (n=348) were in their second pregnancy or less while the remainder were in their third or fourth pregnancy 20.8% (n=94). Only 2% (n=9) were pregnant for the fifth time or

higher. Slightly above half the number of the women 57.4% (n=259) had one to two children born alive while 8.9% (n=40) had a *parity* of three to four children. Only 1.8% (n=8) had a *parity* of five or more. One hundred and thirty eight percent (30.6%) had parity of zero. A considerable proportion of participants had miscarriages with 8.2% (n=37) reporting miscarriage once, 2.0% (n=8) two times and 0.4% (n=2) three times.

By proportion, the participants had attended their first ANC in the first 45.2% (n=204), second 40.6% (n=183) or third 13.3% (n=60) trimester. Concerning the number of ANC visits, about half the number of the women (55.4% (n=250) had attended four or three visits, 29.7% (n=134) had appeared twice or less for ANC while 14.7% (n=66) had attended more than five visits.

Importantly, all the women had received at least one ANC health education with 45.4% (n=205) having received 1-2 ANC education sessions while 44.4% (n=200) had been taught 3-4 times. Only 10.2% (n=46) had received more than five sessions. Regarding birth preparedness, about a third (29.5% (n=133) had not identified a place of giving birth yet. In addition, 31.2% (n=139) did not have an emergency transport plan for delivery.

Table 4.2 Obstetric characteristics of the participants in the study

Characteristics	Frequency	Percent (N=451)
Gravidity		
<=2	348	77.2
3-4	94	20.8
>=5	9	2.0
Parity		
0	138	30.6
1-2	259	57.4
3-4	40	8.9
>=5	8	1.8
No response	6	1.3
Number of miscarriages		
0	184	40.7
1	37	8.2
2	8	2.0
3	2	0.4
No response	220	48.7
Trimester at first ANC visit		
1	204	45.2
2	183	40.6
3	60	13.3
No response	4	0.9
Number of ANC visits		
1-2	134	29.7
3-4	250	55.4
>=5	66	14.7
No response	1	0.2
Number of education received		
1-2	205	45.4
3-4	200	44.4
>=5	46	10.2
Has identified place of delivery?		
Yes	313	69.4
No	133	29.5
No response	5	1.1
Has emergency transport plan?		
Yes	306	67.8
No	139	30.9
No response	6	1.3

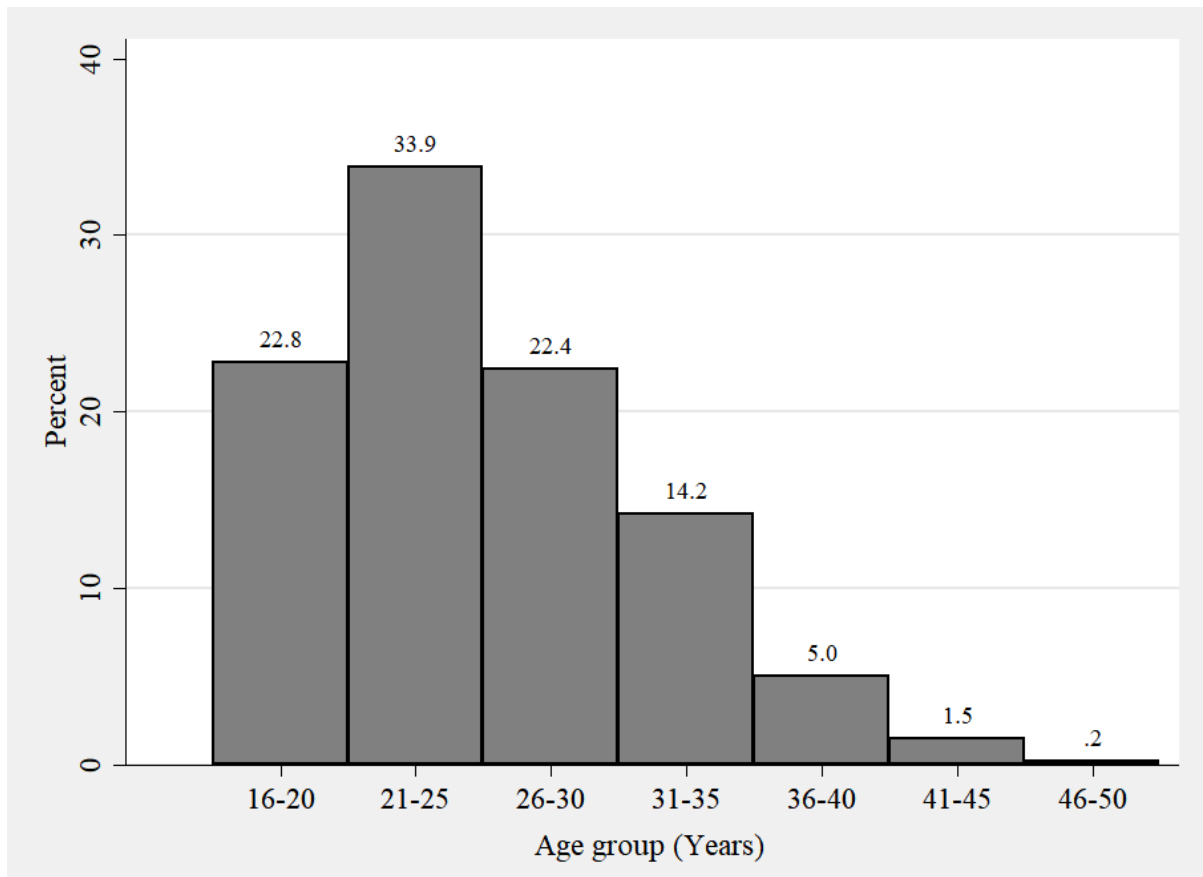


Figure 4.1 Child bearing ages in Lesotho

(N=451)

4.4 ANC LITERACY ASSESSMENT OUTCOMES OF THE PARTICIPANTS AND THE ASSOCIATED FACTORS

4.4.1 ANC literacy outcomes by ANC educational component

Table 4.3 presents participants' performance on ANC educational components, namely, on knowledge of childbirth preparedness, nutrition in pregnancy, danger signs in pregnancy as well as true signs of labour. Concerning preparedness for childbirth, the item with the highest proportion of incorrect scores – the expected mode of delivery, had 36.1% (n=163) of the women not knowing that a pregnant woman should be aware of the expected mode of delivery. The other items with the highest proportion of incorrect scores in the category on preparedness for childbirth were identified a place of giving birth 24.2% (n=109), available emergency transport and cost 23.9% (n=108) as well as expected date of delivery 21.7% (n=98). The item with the smallest proportion of incorrect scores was knowledge of the woman should stay with packed essential items needed for childbirth 7.5% (n=34).

Regarding the reasons for increased nutrition during pregnancy, the item with the highest proportion of incorrect scores was growth of mother's body parts 42.6% (n=142) followed by increase blood needed to supply the baby 20.6% (n=93) and growth of the baby 9.1% (n=41). On the same topic, most of the participants 50.5% (n=228) did not know that peas were examples of body building foods and 30.6% (n=138) did not know that livers were body building food followed by 17.5% (n=79) who did not know that eggs were body building food. A small proportion of participants 12.6% (n=57) and 12.9% (n=58) did not know that milk and beans were body building foods respectively. In relation to the sources of iron, the item with the highest proportion of incorrect scores was eggs 43.9% (n=198) while livers had a lower proportion of incorrect scores 16.6% (n=175). Knowledge of danger signs in pregnancy had the worst performance with the overall percentage mean of 38.3% followed by knowledge of true signs of labour 55.6%.

Table 4.3 Participants' scores on ANC educational components

ANC educational component and sub-items	Percentage overall mean \pm SD (correct responses)	Frequency of incorrect score (%) on sub-items N=451 (100%)
Knowledge of preparedness for childbirth	77.3% \pm 19.9	
Expected mode of delivery		163 (36.1)
Identified a place of giving birth		109 (24.2)
Available emergency transport and cost		108 (23.9)
Expected date of delivery		98 (21.7)
Packed essential items needed for childbirth		34 (7.5)
Knowledge of nutrition in pregnancy	74.3% \pm 17.2	
Knows reasons for increased nutrition		
<i>Growth of mother's body parts</i>		192 (42.6)
<i>Increased blood to supply the baby</i>		93 (20.6)
<i>Growth of the baby</i>		41 (9.1)
Knows body building foods		
<i>Peas</i>		228 (50.5)
<i>Liver</i>		138 (30.6)
<i>Eggs</i>		79 (17.5)
<i>Beans</i>		58 (12.9)
<i>Milk</i>		57 (12.6)
Knows sources of iron		
<i>Eggs</i>		198 (43.9)
<i>Liver</i>		75 (16.6)
Knowledge of danger signs in pregnancy*	38.3% \pm 21.7	
Knowledge of true signs of labour*	55.6% \pm 17.6	

*Participants were asked to list ten correct danger signs in pregnancy and five true signs of labour, therefore these components had no sub-items; SD=Standard deviation of the mean.

4.4.2 ANC literacy scores of the participants

Figure 4.2 presents the ANC literacy scores of the participants. The literacy scores ranged from 3 to 28 with mean score of 17.9. Although the literacy scores were marginally ($p=0.045$) positively skewed, the Shapiro-Wilk test for normality revealed that the literacy scores were normally distributed ($p=0.194$).

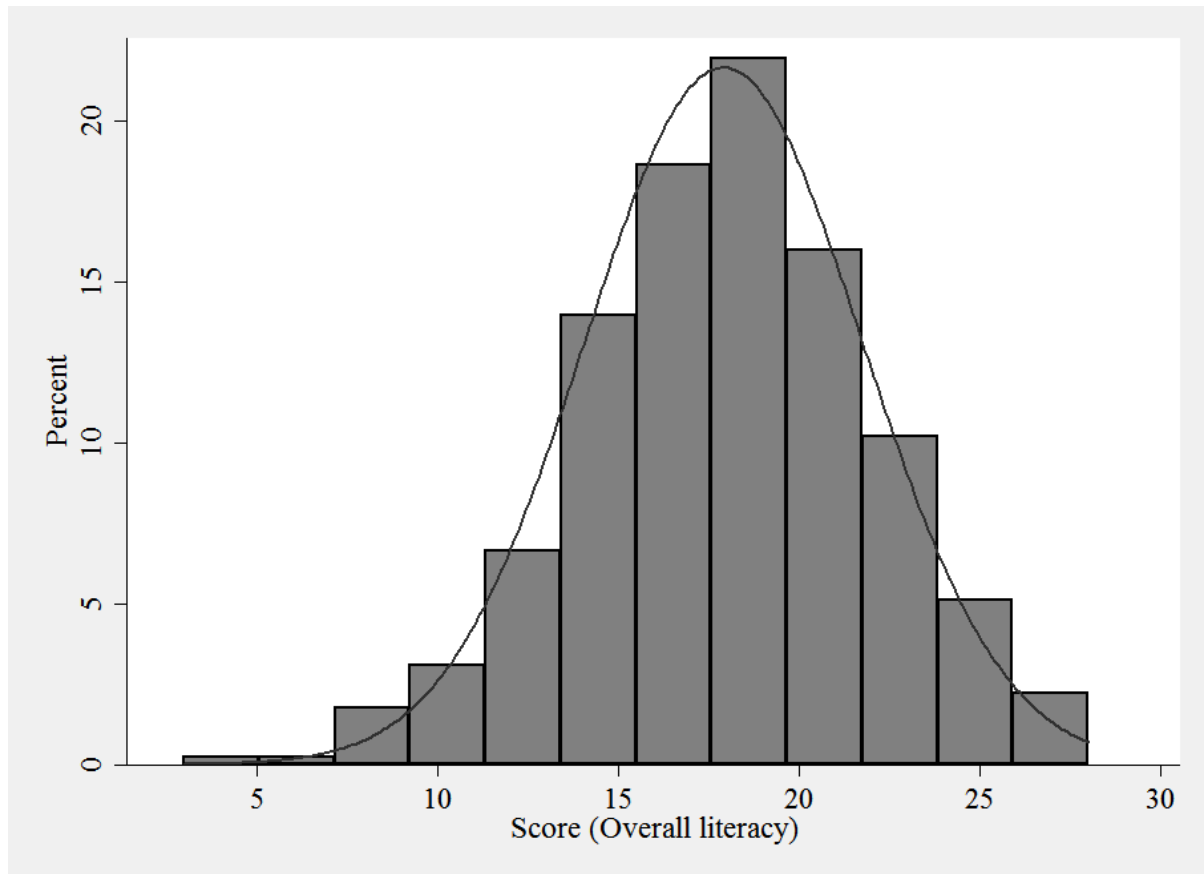


Figure 4.2 Overall scores on ANC educational components

N=451

By proportion, the majority 79.8% ($n=359.8$) of the participants had marginal health literacy, 16.4% ($n=74$) had inadequate health literacy while only 3.8% ($n=17.2$) had high health literacy (see Figure 4.3).

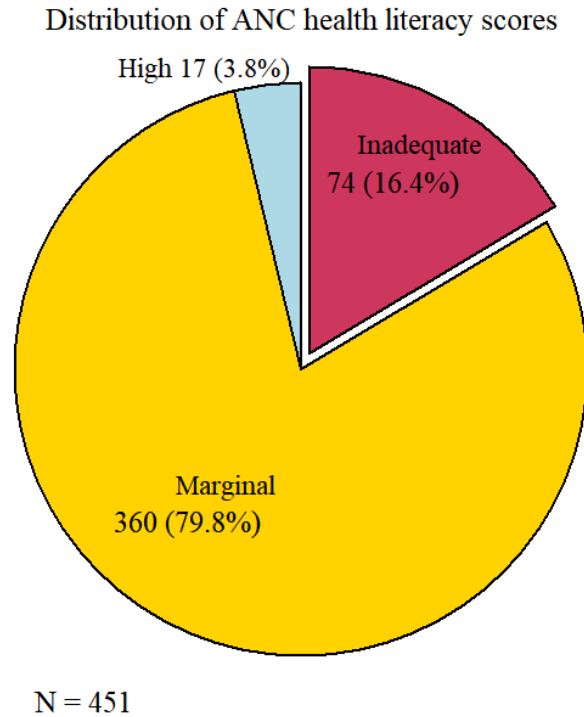


Figure 4.3 Distribution of ANC literacy scores

Note: total ANC literacy score=30; Inadequate= score ≤ 15 ; marginal=score of 15 to 24, high=score of 25-30

Figure 4.4 presents the literacy scores categorised by educational domain. Of the four domains, ranked by skewedness of the graph towards zero, knowledge of preparedness for childbirth and nutrition in pregnancy had the highest performance. Knowledge of true signs of labour had average performance while knowledge of danger signs in pregnancy had the lowest performance.

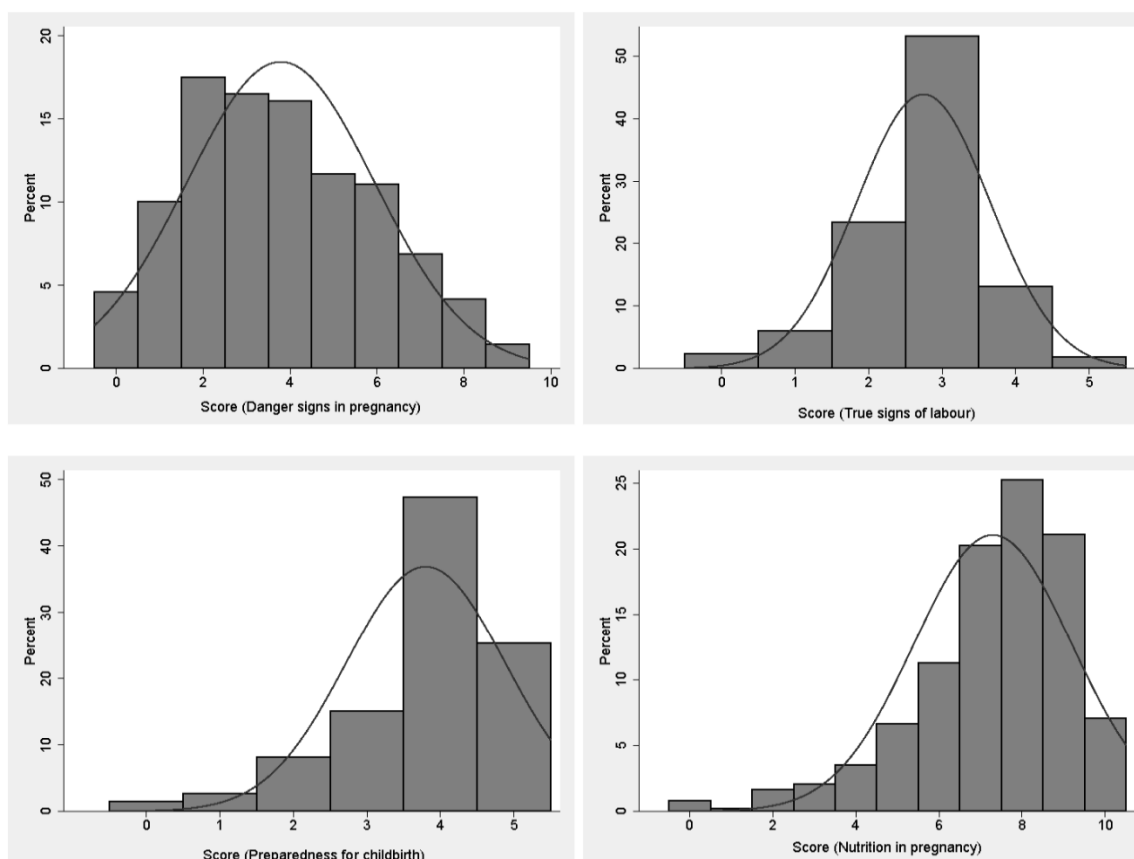


Figure 4.4 ANC literacy scores on individual ANC educational components
N=451

4.4.3 Associations between inadequate ANC literacy and women's characteristics

Table 4.4 illustrates the association between women's characteristics and inadequate literacy levels. In Bivariate analyses, only three characteristics, age ($t=2.052$; 0.041), geographic location ($\text{Chi}^2=41.4$; $p=0.000$) and highest educational qualification attained ($\text{Chi}^2=24.0$; $p=0.000$) were significant. The mean age of participants with inadequate literacy was significantly higher ($p=0.041$) than that of the participants with adequate literacy (26.7 versus 25.2). In addition, the proportion of women with inadequate ANC literacy decreased with the level of education attained; those with no formal education had the highest proportion 33.3% (2 out of 6 participants with no formal education) whilst having tertiary education was associated with the least 8.0% (4 out of 50). Proportionally, much more women with inadequate ANC literacy were from the rural geographic area 32.9% (47 out of 143) compared to the peri-urban area 8.8% (27 out of 308).

However, despite being insignificant ($p>0.050$), two characteristics, number of ANC health education received ($\text{Chi}^2=3.6$; $p=0.162$) and *gravidity* ($\text{Chi}^2=4.3$; $p=0.117$), had considerable associations with ANC literacy. Only a small proportion of women 8.7% (4 out of 46) who had received ANC health education more than five times and a minor proportion of women (4.7% (51 out of 348) who had 1-2 *gravidity* had inadequate ANC literacy signifying the influence of these two variables.

Although insignificant, some important relationships between inadequate literacy and participant characteristics were observed. For example, the average monthly income for the inadequacy literacy category was lower than the adequate literacy category. Similarly, a notably consistent increase in the proportion of women with inadequate ANC literacy with a decrease in the number of ANC visits was also realised. For example, 18.7% (25 out of 134) women who attended ANC visits for the 1-to-2 times had inadequate ANC literacy while 17.2% (43 out of 250) who had attended ANC for the 3-to-4 and 9.1% (6 out of 66) more than fifth time had inadequate ANC literacy.

Table 4.4 Associations between inadequate ANC literacy and women's characteristics

Characteristics	Adequate N (%); N=377	Inadequate N (%); N=74	Chi2/ t	P-Value
Age, mean (95% CI)*	25.2 (24.6 – 25.7)	26.7 (25.1 – 28.3)	2.052	0.041
Family income, mean (95% CI)*	519.5 (396.8 – 642.1)	497.3 (242.1 –752.5)	0.708	0.884
Geographic location			41.4	0.000
Peri-urban	281 (91.2)	27 (8.8)		
Rural	96 (67.1)	47 (32.9)		
Number of ANC visits (current pregnancy)			3.4	0.337
1-2	109 (81.3)	25 (18.7)		
3-4	207 (82.8)	43 (17.2)		
>=5	60 (90.9)	6 (9.1)		
No response	1 (100.0)	0 (0.0)		
Number of ANC education sessions received (current pregnancy)			3.6	0.162
1-2	174 (84.9)	31 (15.1)		
3-4	161 (80.5)	39 (19.5)		
>=5	42 (91.3)	4 (8.7)		
Gravidity			4.3	0.117
1-2	297 (85.3)	51 (14.7)		
3-4	74 (78.7)	20 (21.3)		
>=5	6 (66.7)	3 (33.3)		
Highest educational qualification			24.0	0.000
No formal education	4 (66.7)	2 (33.3)		
Primary	82 (70.1)	35 (29.9)		
Secondary	241 (88.0)	33 (12.0)		
Tertiary	46 (92.0)	4 (8.0)		
No response	4 (100)	0 (0.00)		

*The significance of the associations between two continuous variables – Age and Average family income, were tested using t-test while the rest were tested using Fischer's exact test.

4.4.4 Factors associated with inadequate ANC literacy

In multivariate analyses, rural geographic location ($p=0.000$) was also associated with inadequate ANC literacy (see Table 4.5). In addition, primary educational level ($p=0.004$) emerged as significant predictor of having inadequate ANC literacy. Odds ratios were calculated to describe how likely participants with low level of education and those from rural areas were to having low health literacy compared with their counterparts. Women with no formal education ($OR=5.8$) and those from rural geographic locations ($OR=5.1$) had higher odds ratios of having inadequate ANC literacy. However, age ($p=0.292$) and the number of education received ($p=0.262$) were not significant.

Table 4.5 Factors associated with inadequate ANC literacy

Characteristics	Adequate N (%); N=377	Inadequate N (%); N=74	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Age*, mean (95% CI)	25.2 (24.6 – 25.7)	26.7 (25.1 – 28.3)	0.006 (-0.000 – 0.012)	0.064	0.003 (-0.002 – 0.009)	0.292
Geographic location						
Peri-urban	281 (91.2)	27 (8.8)	1		1	
Rural	96 (67.1)	47 (32.9)	5.1 (3.0 - 8.6)	0.000	4.3 (2.5 – 7.5)	0.000
Number of ANC education received						
≥5	42 (91.3)	4 (8.7)	1		1	
3-4	161 (80.5)	39 (19.5)	2.5 (0.9– 7.5)	0.091	2.7 (0.8– 8.5)	0.096
1-2	174 (84.9)	31 (15.1)	1.9 (0.6-5.6)	0.262	2.3 (0.7– 7.4)	0.174
Educational level						
Tertiary	46 (92.0)	4 (8.0)	1		1	
Secondary	241 (88.0)	33 (12.0)	1.6 (0.5 – 4.7)	0.412	1.4 (0.5– 4.3)	0.544
Primary	82 (70.1)	35 (29.9)	4.9 (1.6-14.7)	0.004	3.2 (1.0– 9.9)	0.049
No formal education	4 (66.7)	2 (33.3)	5.8 (0.7-41.7)	0.084	5.1(0.6–40.9)	0.125

CI=confidence interval; OR=odds ratio; *The significance of Age, a continuous variable, was tested using linear regression analysis and the results (unadjusted and adjusted) indicate the regression coefficient and its 95% confidence interval.

4.5 QUANTITATIVE CONTENT ANALYSES OF PREPAREDNESS FOR CHILDBIRTH

4.5.1 Knowledge of baby layette and mother's essential items for delivery

Table 4.6 presents participants' scores on childbirth preparedness outcomes with regard to knowledge of baby layette and mother's essential items for delivery as well as responses that should be taken during rupture of membranes. Concerning baby layette, a huge proportion of participants 95.4% (n=429) did not know that bunting suits are part of the layette. A small proportion of women could not associate hats (8.4% (n=12), baby wrappers 7.7% (n=9), socks 6.7% (n=4) and vests 6.1% (n=1) as baby layette. Surprisingly, though in small proportion, 6.5% (n=3) participants failed to indicate that nappies form part of baby layette. Regarding mother's items needed for delivery, a commendable proportion of participants 8.1% (n=11) could not mention that menstrual pads should be brought to hospital for delivery.

Table 4.6 Knowledge of baby layette and mother's essential items for delivery

Knowledge of correct baby layette* items and mother's items for delivery	Frequency of incorrect response (%), N=451
Baby bunting suit	429 (95.4)
Baby hat	12 (8.4)
Baby wrappers	9 (7.7)
Baby socks	4 (6.7)
Baby nappies	3 (6.5)
Baby vests	1 (6.1)
Mother's pads	11 (8.1)

*baby layette = essential clothing items for the newborn

4.5.2 Knowledge of correct action during rupture of membranes

Regarding the correct action to take during rupture of membranes, almost all the participants 99.6% (n=499) failed to tell that a pregnant woman should put on a clean pad in her genitals during rupture of membranes and to note the time and colour of the liquid leaking from the genitals (see table 4.7). However, all the participants knew that such a woman should seek medical help immediately.

Table 4.7 Knowledge of correct actions during rupture of membranes

Knowledge of correct action during rupture of membranes	Frequency of incorrect response (%), N=451
Note the time and colour	449 (99.6)
Put on a clean pad in the vagina	449 (99.6)
Rush to the health facility	0 (0)

4.6 SOURCES OF PREGNANCY RELATED INFORMATION

Table 4.8 presents the sources of pregnancy related information. Access to pregnancy related information from online and radio sources were generally low (<10% of the participants). Acquisition of pregnancy related information at school was equally low. However, the radio source offered the widest variety of useful information on pregnancy compared to the other sources. Of note, schools provided very little pregnancy related information while a small proportion of the participants sought for pregnancy related information from the internet.

All the three sources did not provide much relevant information for the ANC educational components assessed, but rather provided information on other topics. The only components covered by the sources were danger signs and nutrition in pregnancy. The scope and depth of the coverage was not comprehensive.

Looking at the radio source, valuable information including the importance of attending ANC sessions, benefits of physical exercise during pregnancy and usage of traditional herbal medicines in pregnancy, were provided to the participants. Other important information learnt from the radio included HIV testing, mother-to-child transmission during pregnancy.

Table 4.8 Sources of pregnancy related information

Source	Information category	Information content	Frequency of content (%); N=451
Online	Birth process	Procedure; behaviour	22 (4.9)
	Care during pregnancy	General care; danger signs	9 (2.0)
	Physical exercise	Exercises in pregnancy	9 (2.0)
Radio	HIV	Testing; mother-to-child transmission	6 (1.3)
	Nutrition in pregnancy	Recommended food; food to avoid	6 (1.3)
	Foetal developmental	Foetal developmental stages	2 (0.4)
		Benefits of exercises	
	Twin pregnancy	Complications of twin pregnancy	1 (0.2)
	Physiological changes	Physiological changes during pregnancy	1 (0.2)
	HIV and AIDS	Testing; mother to child transmission	31 (6.9)
	Care during pregnancy	General care during pregnancy	31 (6.9)
	Physical exercises	Benefits of exercises	31 (6.9)
	Nutrition in pregnancy	Recommended food; Food to avoid	29 (6.0)
	Traditional herbal medicines	Traditional herbal medicines usage in pregnancy	27 (6.0)
	ANC	Importance of attending ANC sessions	9 (2.0)
Learning at school	Teenage pregnancy	Consequences of Teenage pregnancy	2 (0.4)
	Teenage pregnancy	Consequences of Teenage pregnancy	10 (2.1)
	Danger signs in pregnancy	Signs and symptoms	5 (1. 0)

ANC=antenatal care

4.7 DISCUSSION OF THE STUDY RESULTS

4.7.1 Demographic characteristics of participants

The ages of the participants representing the childbearing age ranged from 16 to 47, implying that the spectrum of the childbearing age in the study population is wide. The most common 35% (n=153) childbearing age group was the 21-25 years. Notably, the 16-20 category, associated with high risk pregnancy, was the second most common 23% (n=104) age group. The risky child bearing ages below 18 found in this study emphasises the need for improved health education in young girls. In addition, the proportion of women aged 36 and above, also associated with high risk pregnancy, was about 8% (n=36). Similarly, the existence of pregnancies in late ages also needs attention during ANC educational sessions. To the young girls, it is important to stress knowledge of risks of underage pregnancy, including obstructed labour due to *cephalopelvic* disproportion and other complications such as high blood pressure, anaemia and haemorrhage (Fraser & Cooper 2009:18-19). Regarding marital status, the majority of women 82.0% (n=370) were married while the remainder had never been married 16.6% (n=75) or divorced (0.9%) (n=4). At the time of data collection, more than half the number of the participants were exclusively staying with their husbands 57.2% (n=258), biological parents 22.6% (n=102) or mother-in-law 12.9% (n=58). Only 7.1% (n=32) stayed alone, a characteristic regarded as a risk to pregnancy. Mturi and Moerane (2001:260), note the problem of premarital pregnancy in Lesotho.

More participants 68.3% (n=308) resided in the peri-urban areas compared to remote rural areas 31.7% (n=143). Concerning education, most of the women had attained secondary education 60.7% (n=274) as their highest level of education followed by primary 25.9% (n=117) level and tertiary 11.1% (n=50). Only 1.3% (n=6) had no formal education.

4.7.2 Obstetric history of the participants

The late onset of ANC was common in this study, where 40% of participants sought ANC for the first time in the second trimester, is indicative of pregnant women's apathy on ANC. This apathy is a clear manifestation of the underlying ANC literacy problem. In the developing country of Bangladesh, Kamal, Hassan and Islam (2013:1467) report that 57% seek ANC services in the second trimester or later, a finding comparable to this study. Patel, Rupani and Patel (2013:9), in India, observe that late onset of ANC remains

a challenge in developing countries. In this vein, the WHO (2016:40) reiterates the need for developing countries to address late ANC attendance.

4.7.3 ANC literacy outcomes and associated factors

The most important finding of this study is that considerable proportions of pregnant women in rural Lesotho have marginal 79.8 % (n=359.8) and inadequate 16.4% (n=74) health literacy. The proportions of women with marginal and inadequate health literacy necessitate the need to scale up ANC health education in the country. To address the problem of maternal mortality in Lesotho, ANC literacy, needs to be recognised as a major component of quality of ANC services. There is a need for increased prioritisation of ANC literacy in the national nurse curricula particularly the antenatal care modules and midwifery research agenda, given that Lesotho has one of the highest maternal mortality rates in sub Saharan Africa (GOL 2014:42). Therefore, the relevant authorities driving health and education aspects in the country, need to take the matter of inadequate health literacy seriously, given that health literacy transcends many other determinants of health outcomes (Von Wagner, Steptoe, Wolf & Wardle 2009:860; Annarumma & Palumbo 2016:611).

According to the literature search conducted by the researcher, no study was found in sub Saharan Africa assessing ANC literacy using the quantitative approach. To date, the only comparable study, conducted in Ghana by Lori et al (2014), used a qualitative approach to assess ANC literacy of pregnant women. Lori et al (2014) concluded that pregnant women in Ghana had low health literacy as they could not interpret ANC educational components. Therefore, this quantitative study provides critical findings which point to the need for more quantitative studies for benchmarking.

Despite that other studies in this research area report the general health literacy of pregnant women, their findings are important. These include the one by Wolf, Davis, Osborn, Skripkauskas, Bennett and Makoul (2007:253-260), which quantitatively estimates the prevalence of inadequate general health literacy among pregnant women at 16.0%-38% in the United States. This indicates that health literacy of pregnant women is generally low in developed countries, nonetheless, and that this research area remains important worldwide. Efforts to address this problem, within the auspices of maternal health, therefore remain pertinent.

The major highlights of this study in relation to the factors associated with inadequate ANC literacy is that two covariates, geographic location and level of education, are the

most influential. The significantly lower health literacy levels for the rural women compared to their more urbanised counterparts is testimony to the significance of the mountainous terrain as a natural barrier to ANC health education. Wolf et al (2005:871) assert that individuals living in predominantly rural communities lack adequate health support services that are essential for managing their diseases hence improve their health literacy. Therefore, better availability of ANC education in rural Lesotho is needed. Perlow (2010:123) recognises accessibility to services as the global gateway to addressing global health literacy disparities.

This finding emphasises that pregnant women in the rural, mountainous sparsely populated geographical areas of the country, predominantly characterised with low economic status, lower levels of education and comparatively poorer access to health services, need additional interventions to address the problem of low ANC literacy. Increasing the number of health centres and health workers, and improving training curricula for nurses are some of the critical interventions required. Apparently, the recently (2009 – 2013) renovated health centres in the rural areas of the country, which sought to strengthen health systems in developing countries may not be effective enough.

The barriers to the effectiveness health centres in enhancing ANC literacy need to be further investigated. In particular, however, time constraints, inadequate training of the nurses in the area of teaching ANC literacy and shortage of equipment for enhancing the teaching of ANC educational components may need to be investigated. Despite the contribution by the MCC in funding the renovations of the rural health centres in the country the need to leverage the existence of the health centres to address the problem of low health literacy in these areas cannot be overemphasised (BenYishay & Tunstall 2011:1). There is also a need to use the existing health centres to address other health challenges in the country.

Low levels of education were associated with low ANC literacy in the study. Participants with no formal education were five times more likely to have low health literacy than their counterparts. This implies that there is a need to improve levels of education of women particularly in the rural areas. According to Morojele (2012:38), free primary education policy in Lesotho is clearly inadequate to improve health literacy of the general population. Kateja (2007:29) emphasises that better literacy in women is critical for their quality of life including their quality of health. Therefore, there is a need for more interventions that enable women to access secondary and higher education. Additionally,

the education curriculum in high school needs to have more content on general health literacy aspects, as pointed out by Begoray, Wharf-Higgins and MacDonald (2009:35). Considering the influence of the level of education in this study, it may also be interesting to investigate the impact of education levels on ANC literacy in the neighbouring countries to Lesotho.

The lack of a significant relationship between health literacy and number of ANC health education received may imply that the current ANC teaching methods are ineffective. Conrad, De Allegri, Moses, Larsson, Neuhaan, Müller et al (2012:619) note that ineffective organisation of educational sessions are often to blame for this problem. It is therefore important to review the teaching methods for ANC in the current midwifery curriculum, particularly teaching approaches for women with low levels of education in ANC educational sessions. Nuraini and Parker (2005:3), in Indonesia, advocate for newer methods for ANC education in developing countries. Cowan (2004:280) and Pontius (2014:30) suggest better delivery methods for ANC education including those with low levels of education. Another approach which may improve the teaching of ANC educational components is group care. Lori, Ofosu-Darkwah, Boyd, Banerjee and Adanu (2017:1), in Ghana, report that group antenatal care, meaning women of similar gestational age participating in ANC care, is superior to individual care.

The worst performing ANC educational components in this study were knowledge of danger signs in pregnancy and knowledge of true signs of labour. These two components, clearly linked to maternal mortality, may be the major contributing factors to maternal deaths in Lesotho. Poor knowledge of true signs of labour is a potential cause of home deliveries, a practice common in Lesotho. Incidentally, the proportion of home deliveries in Lesotho is estimated at 23% (GOL 2016:126). Therefore, the teaching of these components should be improved in the country.

Despite the knowledge of nutrition being one of the better performing components in the study, knowledge of body building foods and sources of iron, which are critical during pregnancy, were weak. For example, about half the women in the study did not know that peas were a body building food while one third did not know that livers were a source of iron. This stresses the need for more emphasis on these nutritional components during ANC teaching sessions. Notably, iron deficiency is the leading cause of anaemia during pregnancy in Lesotho (Mugomeri et al 2016:10), and is a specific risk factor for adverse

maternal and perinatal outcomes, including pre-eclampsia, low birth weight, prematurity and perinatal mortality (Imdad & Bhutta 2012:168-177).

Regarding knowledge of preparedness for childbirth, the major gaps were on the knowledge of the contents of baby layette and mother's essential items for delivery. Neonatal hypothermia due to insufficient baby clothing, a problem under-researched in Lesotho despite the adverse weather conditions characterized by high altitude and long cold winters, is a potential cause of neonatal mortality. The statistics of childhood pneumonia, estimated at 63% is testimony to the need to improve knowledge of baby layette in the country (GOL 2016:148). Mullany (2010:426-433), notes the danger of neonatal hypothermia in low resource settings. Regarding knowledge of mother's essential items for delivery, the need for their emphasis during ANC educational sessions cannot be over emphasized.

4.7.4 Sources of pregnancy related information

This study also revealed that small proportions of women were making use of sources of pregnancy related information available to them such as internet and radio, and a few had learnt important lessons about pregnancy at school. Clearly, women need more access to media that is more informative on ANC educational components. Policies promoting general internet access, particularly in rural areas are needed. Community libraries may also help bridge the information gap. Shieh, Mays, McDaniel and Yu (2009:983) emphasise the role of the internet in improving general health literacy and maternal outcomes. Although not tried in Lesotho yet, Jacobs, Lou, Ownby and Caballero (2016:81) and Hou (2010:303) also observe that it is feasible to deliver internet-based interventions, or eHealth education, to improve health literacy skills for people with different socioeconomic backgrounds. Relevant radio programmes addressing ANC literacy are also needed in Lesotho, given that radio media is the most accessible form of media in the country (GoL 2014:33).

The insufficient coverage of the ANC educational components, besides the only two components covered by the radios as noted in the study, is critical. The content learnt from the radio source revealed that the current focus of this source is less inclined on ANC educational components, but rather on other issues of pregnancy such as benefits of physical exercise during pregnancy and usage of traditional herbal medicines in pregnancy, HIV testing, and mother-to-child transmission during pregnancy. This inclination reveals that deep-seated health problems in the country are precluding the

importance of ANC educational components. Lack of physical exercise, high usage of herbal medicines (Mugomeri, Seliane, Chatanga & Maibvise 2015:4), and high prevalence of HIV during pregnancy (Mugomeri et al 2016:10) remain major challenges in Lesotho. For example, about 47% of pregnant women in the country are known to use herbal medicines during pregnancy (Mugomeri et al 2015:4), while the prevalence of HIV among pregnant women in Lesotho is estimated at more than 30% (Mugomeri et al 2016:11). Despite their relevancy and importance, these challenges are getting more attention compared to the classic ANC educational components. Therefore, the need to broaden the content of pregnancy related information on the radios to cover more ANC educational components cannot be overemphasised.

4.8 CONCLUSION

This chapter presented the discussion of demographic and obstetric characteristics of the participants as well as inadequate ANC literacy. Other aspects discussed are sources of pregnancy related information and knowledge of baby layette and mother essential items for delivery. The chapter highlights the occurrence of inadequate ANC literacy as a critical threat to the goal of reducing maternal mortality in Lesotho and emphasises that addressing inadequate ANC literacy requires tackling the problem of access to secondary and higher education, addressing the disproportionate access to health services between rural and more urbanised areas of the country.

CHAPTER FIVE

JUSTIFICATION, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

5.1 JUSTIFICATION OF THE STUDY

The findings of this study contribute to the literature by documenting the levels of ANC literacy in Lesotho and identifying the associated factors. The findings support the need to identify new strategies to increase ANC literacy and evaluate the retention of health information received by pregnant women.

5.2 LIMITATIONS OF THE STUDY

Several limitations worthy noting in this study include the following:

- The extent to which the study can be generalized to all the pregnant women in the country is limited due to potential sampling bias and representativeness of the study sample. Sampling in the peri-urban and rural settings without including the urban setting deprived the study of a comparative group. A population based survey on ANC literacy, which is rare in Lesotho, may be needed.
- The study only looked at associations between participants' characteristics and ANC literacy. As a result, associations reported in this study do not imply causation.
- The fact that a new questionnaire for assessing ANC literacy was developed for this study, may not be without challenges. For example, the use of an arbitrary cut-off value for defining inadequate health literacy was another notable limitation of this study. In addition, the questionnaire may have left out other components of ANC health education. Therefore, the results of this study need to be interpreted within the confines of this questionnaire and its limitations.

5.3 RECOMMENDATIONS

Based on the findings of this study, there are important recommendations for practising ANC health educators, nursing education, future research and policy makers.

5.3.1 ANC health educators

- This study recommends special teaching sessions for rural women and those with low levels of education, particularly those without formal education.
- To improve the effectiveness of ANC teaching sessions and to cater for differences in educational backgrounds for the pregnant women, ANC educators should be capacitated with teaching and facilitation skills such as skills for developing teaching plans and content selection.
- The development of tools for assessing women's comprehension in all the ANC educational components, is also required to evaluate the effectiveness of ANC teaching sessions.
- There is also a need to develop a workbook or a teaching guide for ANC educational components.
- Incorporating ANC literacy screening into maternal assessment, as advocated by Sand-Jecklin, Daniels and Lucke-Wold (2017:176), may be necessary to bridge ANC literacy gaps in the country.

5.3.2 Nursing education

- There is a need for increased prioritisation of ANC literacy in the national nurse curricula particularly the antenatal care modules and midwifery research agenda.
- The ANC educational components with the lowest scores – knowledge of danger signs in pregnancy and true signs of labour – emphasise the need for ANC education curricula in the country to prioritise the teaching of these components.

- This study also reveals that there are gaps in ANC educational components, namely knowledge of baby layette and mother's essential items for delivery, which emphasises the need to strengthen ANC education of these components.

5.3.3 Policy makers

- This study recommends the increasing of content on ANC educational components on radio stations.
- Given the connection between health literacy and empowerment of women (Crondahl & Eklund Karlsson 2016:1), the study recommends policy makers to draft suitable policies and guidelines that support higher education to empower women.

5.3.3 Future research

- To the researcher's knowledge, this was the first study to assess levels ANC literacy in Lesotho. Therefore, future research should focus on qualitative approaches to obtain an in-depth knowledge of ANC literacy.
- In addition, future research should focus on the impact of ANC literacy on health outcomes.

5.4 CONCLUSION

A considerable proportion of women in Lesotho have inadequate health literacy. The main factors associated with low ANC literacy were geographic location and educational level. To address these challenges, two important policies in the country need to be strengthened – health systems and education policies. The health systems policy which guides rural health centres needs to improve access and quality of health services at rural health centres. This study also reveals that the educational policy of Lesotho, which guarantees free primary education, although welcome, needs to be upgraded to include

free education at secondary level for people of low economic status. Currently, a limited number of children classified as vulnerable and orphans are eligible for educational assistance provided by predominantly non-governmental organisations, with the government assisting in limited cases.

The ANC educational components with the lowest scores – knowledge of danger signs in pregnancy and true signs of labour – emphasise the need for ANC education curricula in the country to prioritise the teaching of these components. This study also reveals that there are gaps in ANC educational components, namely knowledge of baby layette and mother's essential items for delivery, which emphasises the need to strengthen ANC education of these components.

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APPENDICES

ANNEXURE A: ANC LITERACY ASSESSMENT TOOL

SECTION A: DEMOGRAPHIC AND OBSTETRIC CHARACTERISTICS OF THE STUDY PARTICIPANTS

ID No.				Date		Visit Type		QC		Assisted?	YES	NO
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A1. Age <input type="text"/> A2. Marital status 1. Never Married <input type="checkbox"/> 2. Married <input type="checkbox"/> 3. Divorced <input type="checkbox"/>	A3. Stays with 1. Alone <input type="checkbox"/> 2. Husband <input type="checkbox"/> 3. Mother in law <input type="checkbox"/> 4. Biological parents <input type="checkbox"/>	A4. This is the....pregnancy 1. 1 st <input type="checkbox"/> 2. 2 nd <input type="checkbox"/> 3. 3 rd <input type="checkbox"/> 4. Specify <input type="checkbox"/>	A5. No. of ANC visit (this pregnancy) 1. 1 st <input type="checkbox"/> 2. 2 nd <input type="checkbox"/> 3. 3 rd <input type="checkbox"/> 4. 4 th <input type="checkbox"/> 5. Specify <input type="checkbox"/>	A6. Time of pregnancy at 1st ANC visit (this pregnancy) 1. One to three months <input type="checkbox"/> 2. Four to six months <input type="checkbox"/> 3. Seven to nine months <input type="checkbox"/>	A7. No. children carried to term 1. One <input type="checkbox"/> 2. Two <input type="checkbox"/> 3. Three <input type="checkbox"/> 4. Specify <input type="checkbox"/>
A8. No. of miscarriages 1. None <input type="checkbox"/> 2. One <input type="checkbox"/> 3. Two <input type="checkbox"/> 4. Specify <input type="checkbox"/>	A9. No. of ANC education received this pregnancy 1. None <input type="checkbox"/> 2. One <input type="checkbox"/> 3. Two <input type="checkbox"/> 4. Three <input type="checkbox"/> 5. Specify..... <input type="checkbox"/>	A10. Average monthly family income <input type="text"/>	A11. Highest qualification 1. Primary <input type="checkbox"/> 2. Secondary <input type="checkbox"/> 3. Tertiary <input type="checkbox"/> 4. No formal Education <input type="checkbox"/>	A12. Have you identified a place where you will give birth? 1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>	A13. Do you have transport plan in case of an emergency birth? 1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>

A14. What pregnancy related information have you ever searched online?

.....

A15. What information related to pregnancy did you learn from the radio?

.....

A16. What pregnancy related information did you learn from your school?

.....

SECTION B: SHORT QUESTIONS

B1 Danger signs in pregnancy

Please list ten signs and symptoms that show danger during pregnancy			
1.....	4.....	7.....	10.....
2.....	5.....	8.....
3.....	6.....	9.....

B2 True signs of labour

Please list five true signs that show that a pregnant woman is about to give birth		
1.....	3.....	5.....
2.....	4.....

B3. Preparedness for childbirth

Please tick five applicable responses from the following			
A pregnant lady who is prepared for childbirth is aware of:			
1. The date of childbirth <input type="checkbox"/>	3. Has the name of the baby ready <input type="checkbox"/>	5. Has packed necessary items for childbirth <input type="checkbox"/>	7. Has stocked enough food <input type="checkbox"/>
2. Expected mode of giving birth <input type="checkbox"/>	4. Available emergency transport and cost <input type="checkbox"/>	6. Has identified a place for giving birth <input type="checkbox"/>	<input type="checkbox"/>

B4 Nutrition in pregnancy

Please tick three appropriate responses			
A pregnant woman should eat extra nutrients for:			
1. Satisfy food cravings <input type="checkbox"/>	2. Growth mother's body parts <input type="checkbox"/>	3. Growth of the baby <input type="checkbox"/>	4. Good body looking <input type="checkbox"/>
			5. Increase blood needed to supply the baby <input type="checkbox"/>
Please tick five appropriate responses			
The following are examples of body building food.			
6. Pumpkin <input type="checkbox"/>	7. Beans <input type="checkbox"/>	8. Wheat <input type="checkbox"/>	9. Liver <input type="checkbox"/>
10. Milk <input type="checkbox"/>	11. Peas <input type="checkbox"/>	12. Potatoes <input type="checkbox"/>	13. Eggs <input type="checkbox"/>
Please tick two appropriate responses			
Iron is found in the following food:			
14. Liver <input type="checkbox"/>	15. Eggs <input type="checkbox"/>	16. Potatoes <input type="checkbox"/>	

B5 LONG QUESTIONS

1.List items that should be brought to the health facility by a woman who is prepared for child birth

2. A 34 weeks pregnant woman notices some water leaking from the genital area. Explain the actions that the woman should take.

.....
.....

ANNEXURE B: EXPERT ANALYSIS QUESTIONNAIRE

INSTRUCTIONS: Please tick appropriate box and fill in the spaces where applicable.

Respondent No:

Do not tick more than once per question.

A. DEMOGRAPHIC DETAILS

A1. Age (yrs) <input type="text"/>	A2. Sex 1. Female <input type="checkbox"/> 2. Male <input type="checkbox"/>	A3. Highest qualification attained 1. B.A <input type="checkbox"/> 2. M.A <input type="checkbox"/> 3. PHD <input type="checkbox"/>	A4. Currently work related to midwifery practice 1. Yes <input type="checkbox"/> 2. No <input type="checkbox"/>	A5. Number of years in current position 1. Less than 1 year <input type="checkbox"/> 2. More than 1 year <input type="checkbox"/> 3. More than 2 years <input type="checkbox"/>
--	--	--	--	---

B. QUESTIONS EVALUATING THE ANC ASSESSMENT TOOL

ANC Component	Response					Comment
	Very irrelevant 1	Irrelevant 2	Neutral 3	Relevant 4	Very relevant 5	
B1. Danger signs in pregnancy						
B2. True signs of labour						
B3. Preparedness for childbirth						
B4. Nutrition in pregnancy						

ANNEXURE C: INFORMATION SHEET FOR STUDY PARTICIPANTS: ENGLISH VERSION

STUDY TITTLE:

ANC LITERACY OF PREGNANT WOMEN IN THABA-TSEKA AND MASERU DISTRICTS, LESOTHO

Dear respondent

Introduction

Antenatal care (ANC) is pivotal to safeguarding the life of a pregnant woman and the unborn child by providing appropriate advice for a healthy pregnancy, safe childbirth, and postnatal recovery (Fraser & Cooper 2009:263). World Health Organization (WHO) (2006:2) emphasises that pregnant women should have basic knowledge of ANC health information or ANC literacy, particularly on danger signs of pregnancy and labour signs to enable them to seek appropriate care early (Berkman et al 2011:98). Improving health literacy is one practical way to improve informed decision making capabilities of pregnant women. As Fraser, Roderick, Casey, Taal, Yuen and Nutbeam (2013:133) note, higher health literacy levels are associated with better health outcomes.

Lesotho, a developing country with one of the highest maternal mortality rates in sub Saharan Africa, has very little information known in the research area of ANC literacy (Hussein 2012:136). The Government of Lesotho (GOL) (2014:42) indicates that ineffective decision-making by pregnant women due to ineffective ANC education may be contributing to maternal morbidity and mortality. Therefore, the purpose of the study is to explore ANC literacy levels among women attending ANC in Lesotho. The study aims to improve ANC outcomes in the country.

What the study involves

The study will assess ANC literacy in four ANC educational components, namely (1) Danger signs in pregnancy (2) true signs of labour (3) Preparedness for childbirth and (4) Nutrition in pregnancy. A total of 476 women attending antenatal check-ups In Thaba-Tseka and Maseru will be assessed.

Notification of results of the study

The study report will be submitted to the relevant authorities in the Ministry of Health and the hospitals participating in the study. The results are expected to improve ANC health education hence maternal outcomes. The findings of the study will be sent for review and possible publication in suitable journals.

Risks of being involved in the study

No adverse events are anticipated to the patients and the participants in the study. The researcher will not carry out any medical procedure or administer any drug to the patients. However, some participants may face risks, including consequences of information disclosure when responding to the questionnaires. To safeguard patient information privacy, the researcher will observe standard ethical principles for conducting medical research, including voluntary participation, the right to decline answering certain questions and the right to withdraw their participation at any time.

Participation in the study is voluntary

Participation in the study is entirely voluntary. The expert team and pregnant women included in the study reserve the right to deny to participate in the study.

Efforts will be made to keep personal information confidential. Personal information will only be disclosed if required by law. The Ethics Committee of the Ministry of Health of Lesotho reserves the right to demand inspection of the data records if the need arises. However, publication of the results will not directly lead to identification of the patients included and individuals participating in the study.

If you have questions about your rights as a research subject, you may contact the researcher at +266589 01538 or the Secretariat of the Ethics Committee of Ethics Committee of the Ministry of Health of Lesotho at telephone number (+266) 2222 6317.

ANNEXURE D: INFORMATION SHEET FOR STUDY PARTICIPANTS (SESOTHO VERSION)

Selelekela

Tliniki ea bokhachane e bohlokoa bophelong ba mokhachane le ho ngoana ea esong ho hlahe ka ho fana ka boelets'i ha bokhachane bo matlafetseng, pepo e bolokehileng le ho fola hantle ka mora pepo. Mokhatlo oa lefats'e oa machaba WHO o tiisa hore bokhachane ba lokela hoba le thuto ea mantlha ka litaba tsa bokhachane haholo ka mats'oao a kotsi bokhachaneng le matso'ao a pepo hore ba tle ba ba batle kalafo e ts'oanelang e sale nako. Matlafatso ea tsebo ka bophelo ba bokhachane bo thusa bokhachane ho e tsa liqeto tse nepahetseng. Hape ho ba le tsebo e ngata ka litaba tsa bokhachane bo a maha'ngoang le bophelo bo ntlafetseng ba bokhachane.

Lesotho, e'ngoe ea linaha tse lekang ho hola moruong karolong e tjametsoe ke sekhahla se phahameng sa basali ba hlokahang nakong ea pepo le bana ba hlokahalang nakong ea khoeli feela ha ho tsebahale hantle horena bokhachane ba tseba ha kae ka thuto ea bokhachane. 'Muso oa Lesotho o bonts'a hore ho se etse liqeto tse nepahetseng nakong ea bokhachane ho ka a maha'ngoang le thuto e sa chorang ea bokhachane bo nka karolo ho phahamiseng sekhahla sa mafu ana. Ka hona sepheo sa boithuto bona ke ho ithuta horena bokhachane ba tseba ha kae ka thuto ea bokhachaneng le ho hlahisa se sebelisoa se ka sebelisoang ho hlahloba tsebo ka thuto ea bokhachaneng ho bokhachane ba tsamaeang litliniki. Boithuto bona bo leka ho matlafatsa bophelo ba bokhachane.

Sekenellang ka hara boithuto:

Boithuto bona hlahloba tsebo ea thuto ea bokhachane mekhahlelong e mene, (1) tsebo ka matso'ao a kotsi bokhachaneng, (2) mats'oao a pepo, (3) phepo bokhachaneng le (4) tsebo ka biotokisetso ba nako ea pepo.

Tsebiso ea sephetho sa boithuto:

Tlaleho ea sephetho e tla isoa ho ba ikarabellang lekaleng la bophelo le litsing tse nkileng karolo boithutong bona. Sephetho se reretsoe ho ntlafatsa tsebeliso ea ho fan aka thuto ea bokhachane ele ho ntlafatsa bophelo ba bokhachane. Liphuputso tsohle li tla hlahlojoa mme li phatlalatsoe.

Kotsi ea ho kenella boithutong:

Ha ho na litla-morao tse mpe tse lebeletsoeng ho bakuli ba nkang karolo boithutong bona. Mofuputsi a ke ke a fa motho ea nkang karolo setlhare sefeng kapa sefeng. E le ho boloka lekunutu la bakuli, mofuputsi o tla latela melaoana ea bofuputsi e khothalelitsoeng ke Helsinki ka 2013.

Melemo ea honka karolo:

Ha ho na chelete eo batho ba nkileng karolo ba tla e fumana.

Ho nka karolo ke boithaopo:

Ho nka karolo ke boikhethelo ba motho ka mong. Bookameli ba litsi tseo boithuto bona bo tla etsoa ho tsona bo na le tokelo ea ho hana ka tumello ea boithuto bona.

Poloko ea lekunutu:

Lintlha tsa mokuli li tla t'sireletsoa ka hohle-hohle, li tla tsebisoa ha fela molao o lumela. Komiti ea molao ho tsoa lekaleng la bophelo ena le tokelo ea ho hlahloba liphuputso ha ho hlokahala. Le ha ho le joalo, phatlalatso ea sephetho e ke ke ea supa ba nkileng karolo ka kotloloho.

Ha u na le lipotso kapa u hloka tlhakisetsa mabapi le litokelo tsa hao ho nkeng karolo boithutong bona, u ka letsetsa lekhotlana la ketsa-molao la lekala la bophelo nomorong tse latelang (+266) 2222 6317. U ka fumana moetapele oa boithuto:mona: 58901583, email Tabeta_seeiso @yahoo.com

ANNEXURE E: CONSENT FORM (ENGLISH VERSION)

CONSENT FORM FOR ANC LITERACY

I _____ understand that I am being asked to participate in the research study entitled: **ANC literacy of pregnant women in Thaba-Tseka and Maseru districts, Lesotho**. I understand that the aim of this study is to explore knowledge and gaps about ANC educational components with the purpose of improving ANC services as explained by the researcher.

I realise that participation in this study is voluntary and I may withdraw from the study at any time. I am aware that withdrawal from participating will not endanger my right to health services. I therefore agree to respond to the questions that will be asked in this study.

I am aware that I may refuse to disclose information which I perceive to be confidential. I also understand that all research data from this study will be kept confidential. However, this information may be used in professional decision making.

I have read and understand the information contained in this consent form and therefore, I agree to participate.

Participant's Signature_____ **Date**_____

Researcher's Signature_____ **Date**_____

ANNEXURE F: CONSENT FORM (SESOTHO VERSION)

CONSENT FORM

Foromo ea ho lumela ho nka karolo liphuputsong

‘Na_____ ke utloisisa hore ke kopuo

ho nka karolo liphuputsong tse fuputsang ka tsebo ea thuto ea bokhachane ho bakachane ba Thaba-Tseka le Maseru, Lesotho. Ke utloisisa hore sepheo sa boithuto bona ke ho hlahloba boemo ba tsebo le likhahello ka thuto ea bokhachaneng ka morero oa ho ntlafatsa lits’ebeletso tsa bakhachane joalo ka ha mofumahatsana Tabeta Seeiso a hlalositse.

Kea elelloa hore boithuto bona ho bo tlame, le hore nka emisa ho tsoela pele nako eohle ha ke batla. Kea utloisisa hore ho emisa ho tsoela pele ho nka karolo liphuputsong ha ho ame tokelo eaka ea ho fumana lits’ebeletso tsa bophelo. Ka hona ke lumela ho arba lipotso tseo ke tla li botsoa liphuputsong tsena.

Kea hlokomela hore nka khetha ho se fane ka litaba tseo ke utloang e le tsa lekunutu. Hape kea utloisisa hore litaba tse tla fumanoa liphuputsong tsena li tla bolokoa e le lekunutu. Le hoja litaba tse joalo li ka sebelisoa sebakeng sa ho etsa liqeto tse itseng.

Ke balile ka utloisisa litaba tse ka hara tokomane ena ‘meke lumela ho nka karolo

Boitekeno:

Mokhachane_____ **Letsatsi**_____

Setsibi sa bopepisi_____ **Letsatsi**_____

Boitekeno ba Mofuputsi _____ **Letsatsi**_____

ANNEXURE G: UNISA RESEARCH ETHICS COMMITTEE PERMISSION



RESEARCH ETHICS COMMITTEE: DEPARTMENT OF HEALTH STUDIES REC-012714-039 (NHERC)

7 December 2016

Dear Miss T Seeiso

Decision: Ethics Approval

HS HDC/578/2016

Miss T Seeiso

Student: 4843-489-2

Supervisor: Prof TMM Maja

Qualification: D Litt et Phil

Joint Supervisor:

Name: Miss T Seeiso

Proposal: Antenatal health literacy of pregnant women in Thaba-Tseka and Maseru Districts, Lesotho.

Qualification: MPCHS94

Thank you for the application for research ethics approval from the Research Ethics Committee: Department of Health Studies, for the above mentioned research. Final approval is granted for the duration of the research period as indicated in your application.

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the Research Ethics Committee: Department of Health Studies on 7 December 2016.

The proposed research may now commence with the proviso that:

- 1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
- 2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Research Ethics Review Committee, Department of Health Studies. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.*



University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

3) *The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.*

4) *[Stipulate any reporting requirements if applicable].*

Note:

The reference numbers [top middle and right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the Research Ethics Committee: Department of Health Studies.

Kind regards,



Prof L Roets

CHAIRPERSON

roetsl@unisa.ac.za



Prof MM Moleki

ACADEMIC CHAIRPERSON

molekmm@unisa.ac.za

ANNEXURE H MINISTRY OF HEALTH LESOTHO PERMISSION TO CONDUCT THE STUDY



LESOTHO

Ministry of Health
PO Box 514
Maseru 100

REF: ID01-2017

Date: 24 January 2017

To
Tabeta Seeiso (Mrs.)
MA (Nursing candidate)
UNISA

Category of Review:

- ☒ Initial Review
- ☐ Continuing Annual Review
- ☐ Amendment/Modification
- ☐ Reactivation
- ☐ Serious Adverse Event
- ☐ Other _____

Dear Mrs. Tabeta,

RE: Antenatal Health Literacy of Pregnant Women in Thaba-Tseka and Maseru districts, Lesotho

This is to inform you that on 11 January 2017 the Ministry of Health Research and Ethics Committee reviewed and **APPROVED** the above named modified protocol and hereby authorizes you to continue the study according to the activities and population specified in the protocol. Departure from the approved protocol will constitute a breach of this permission.

This approval includes review of the following attachments:

- ☒ Protocol dated 02/01/2017
- ☒ English & Sesotho consent forms dated November 2016
- ☒ Data collection forms in Sesotho
- ☐ Data collection forms in English
- ☐ Participant materials *[insert types, versions, dates]*
- ☒ Other materials: Letter of ethical clearance from UNISA & PI's CV

This approval is **VALID** until 23 January 2018.

Please note that an annual report and request for renewal, if applicable, must be submitted at least 6 weeks before the expiry date.

All serious adverse events associated with this study must be reported promptly to the MOH Research and Ethics Committee. Any modifications to the approved protocol or consent forms must be submitted to the committee prior to implementation of any changes.

We look forward to receiving your progress reports and a final report at the end of the study. If you have any questions, please contact the Research and Ethics Committee at rcumoh@gmail.com (or) 22226317.

Sincerely,


Dr. Nyane Letsie
Director General Health Services


Dr. A. Ranotsi
Chairperson NH-IRB

ANNEXURE I: APPROVAL FROM STUDY SITE 1

*Paray Mission Hospital
AND SCHOOL OF NURSING*



P.O.Box 2
Thaba-Tseka 550
Lesotho

03 April 2017

Tabeta Seeiso
Paray School of Nursing
P.O. Box 2
Thaba-Tseka 550

RE: Approval to conduct a master research study

Hereby I confirm that your application to conduct masters' research study with the title: **"Antenatal health literacy of pregnant women in Thaba-Tseka and Maseru Districts, Lesotho"** is approved. This is in line with the approval you received from Ministry of Health Research and Ethics Committee.

I wish you good luck in your study.

Kind regards,

Sr. Callixtina Maepa
Manager Hospital Nursing Services



Tel/Fax:(+266)22 900256, Tel:(+266) 22900436, E-mail: paray@ilesotho.com
Website: www.paray.co.ls

ANNEXURE J: APPROVAL FROM STUDY SITE 2



27th March 2017

Tabeta Seeiso

Nurse Educator

Paray school of Nursing

Dear Madam/Miss

RE: APPLICATION TO CONDUCT A MASTER RESEARCH STUDY AT ST JOSEPH'S HOSPITAL.

Your letter dated 08th March 2017 on the above mentioned matter refers.

I am glad to inform you that your request has been approved.

You are allowed to conduct a research in our Facility on "**Antenatal Health literacy of pregnant woman in Thaba – Tseka and Maseru Districts, Lesotho**"

Kindly, strictly adhere to patient's information confidentiality at any time of your study. I wish you all the success and request to receive a copy of your final report to improve where applicable.

Yours faithfully,



Dr. M. Kambulandu

Medical Superintendent